



## **1997 ANNUAL RESIDENT HATCHERIES REPORT**

**IDFG 98-41  
August 1998**

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## RESIDENT FISH HATCHERIES

### 1998 ANNUAL REPORT

Resident fish hatcheries reared and stocked over 19 million fish weighing 1.26 million pounds. More than 2,500 stocking trips were made to plant fish in over 500 waters in the state.

Resident hatchery program costs were 2.1 million dollars for an average cost of \$1.66 per pound or \$0.11 per fish. Cost varied greatly between the hatcheries. Cabinet Gorge Hatchery had the lowest cost per fish at \$0.056 and Ashton Hatchery had the highest at \$0.22 per fish. This is due to the great diversity in the resident hatchery system goals. Cabinet Gorge Hatchery produced 3.9 million fish averaging 1.74 inches in length using a seven month growing season and Ashton Fish Hatchery used the entire 12 months of fish production and produced an average 6.2 inch rainbow trout *Oncorhynchus mykiss*.

Rainbow trout of catchable size (8 to 12 inches) composed approximately one-half of the program costs at approximately \$1.1 million.

The Sandpoint Fish Hatchery was taken out of production by a heavy snowstorm December 31, 1996 that destroyed the water supply line. This hatchery raised Westslope cutthroat trout *Oncorhynchus clarki lewisi* brood fish and various other species. The water supply line was repaired during 1998 although this hatchery produced no fish during 1998..

Three captive broodstocks were maintained and spawned at the resident hatcheries producing over 18 million eggs for various resident programs. These stocks include Kamloops, and Hayspur rainbow trout maintained at Hayspur Hatchery; and Westslope cutthroat trout at the Clark Fork Fish Hatchery.

The Idaho Department of Fish and Game Engineering Bureau had limited funds for hatchery maintenance work during 1998. This bureau installed some screening and fencing at various hatcheries and installed the structure for a travelling moss screen at Hagerman Hatchery.

**Idaho Department of Fish and Game  
Resident Hatcheries Fish Production  
01/01/97 - 12/31/97**

Hatchery	Put-and-Take		Put-Grow-and-Take		Average Fish per pound	Feed		Average Length	Total cost	Cost/ 1,000 fish	Cost/ pound
	Number	Pounds	Number	Pounds		Pounds	Costs				
American Falls	197,260	89,949	374,070	11,203	5.6	102,639	35,896	7.1	\$234,515	\$410.00	\$2.32
Ashton	148,398	34,743	407,866	7,179	13.27	36,942	12,532	5.51	\$140,113	\$251.00	\$3.34
Cabinet Gorge	0	0	3,746,571	8,363	448.00	8,594	5,500	1.92	\$223,820	\$59.74	\$26.76
Clark Fork	201,078	44,767	2,186,581	56,516	23.57	147,817	66,308	4.39	\$216,000	\$90.47	\$2.31
Clearwater	594,584	86,102	0	0	6.9	72,218	24,978	6.6	<sup>a</sup> \$38,820	\$65.29	\$0.45
Grace	413,660	104,487	331,745	24,292	5.09	131,628	60,267	7.30	\$210,605	\$321.76	\$1.64
Hagerman	682,570	227,836	2,202,854	163,326	7.38	408,440	148,139	6.50	\$508,200	\$176.13	\$1.30
Mackay	101,609	54,070	3,810,400	31,934	45	101,000	52,400	3.67	\$196,400	\$50.20	\$2.28
McCall	0	0	354,200	2,130	166	2,563	1,400	2.3	\$35,300	\$100.00	\$16.57
Nampa	556,718	118,208	693,859	19,006	6.00	233,060	92,961	6.90	\$406,743	\$325.24	\$1.96
Sandpoint	0	0	0	0	0	0	0	0	\$0	\$0.0	\$0.0
TOTAL PRODUCED	2,895,877	830,162	14,108,146	323,949	14.73	1,244,901	\$498,981	<sup>b</sup> 5.33	\$2,004,116	<sup>b</sup> \$117.86	\$1.74

<sup>a</sup>Does not include any permanent salaries.

<sup>b</sup>Denotes weighted means.

Total cost for each hatchery is that hatchery's total budget minus capital outlay expenditures.

**IDAHO DEPARTMENT OF FISH AND GAME**

**ANNUAL REPORT**

**AMERICAN FALLS FISH HATCHERY**

**1997**

**Bill Doerr  
Fish Hatchery Manager I**

**David Billman  
Assistant Fish Hatchery Manager**

**Todd Garlie  
Fish Culturist**

## INTRODUCTION

American Falls Fish Hatchery (AFFH) is a resident fish hatchery located on approximately 120 acres of land owned by the Idaho Department of Fish and Game (Department) on the north bank of the Snake River, one-half mile below the American Falls Reservoir Dam. The AFFH is two miles by road from the town of American Falls.

The primary objective of the AFFH is to rear 250,000 catchable sized (9- to 12-inch) rainbow trout *Oncorhynchus mykiss*. The AFFH also produces fingerling (four- to six-inch) rainbow trout as requested. The number and pounds of fingerling produced varies from year to year.

Three permanent state employees staff the AFFH. A three-month temporary employee is hired for the planting season.

Funding for the AFFH operation comes from license monies, from interest on an American Falls Irrigation District endowment, and from mitigation funds for the Gem State Project at Idaho Falls.

The physical layout of the AFFH consists of twenty single pass 100 ft x 8 ft x 3 ft concrete raceways and a hatchery building containing fourteen 21 ft x 4 ft x 2 ft concrete rearing vats.

Water for the AFFH comes from Reuger Springs located on the AFFH property. These springs flow an average of 20 cubic feet per second (cfs) at a water temperature of 55° - 58° F.

## FISH PRODUCTION

The AFFH raised Hayspur strain rainbow trout, Hayspur Kamloops trout, and Troutlodge Kamloops trout for the 1997 production year. These strains of fish perform very well at this facility.

The Clark Fork Fish Hatchery received as transfers 41,925 catchable rainbow trout (13,975 lb.) and 179,978 fry (413 lb.) from AFFH. The AFFH stocked 155,335 catchable rainbow trout (75,974 lb.), and 194,092 fingerling (10,790 lb.) during this period. Total stocked and transferred is 571,330 fish, weighing 101,152 pounds (Appendix 1).

Costs for 1997 for various sizes of fish food were \$35,896.03. Feed costs for the year were \$0.3549 per pound of fish produced, or \$0.0628 per fish (appendix 2). Production costs overall were \$2.09 per pound of fish produced, or \$0.37 per fish. In the middle of the 1997 production year, the AFFH production plan was changed from mostly catchable production to half catchable and half fingerling production in 1998. This change resulted in increased production costs this year, as half of the raceways were left empty in the fall to leave space for spring fingerling.

Feed conversion for the year averaged 1.14 pounds of feed per pound of fish produced.

## **HATCHERY IMPROVEMENTS**

- The first phase of construction was completed on a public nature trail. Three hundred trees and shrubs were planted for a wildlife shelterbelt, and a drip irrigation system was installed for those shrubs.
- The raceway tailrace area was covered with decking to enhance employee safety.
- Repairs and modifications were begun to bring the AFFH into compliance with the Americans with Disabilities Act.
- An additional bedroom was finished in residence #2, and old, wooden-framed windows were replaced with aluminum windows.
- A new sprinkler system pump was installed on part of the irrigation system. A timer and electric valves were installed.
- Walls in the basement of residence #1 were repaired as part of a radon abatement program.
- A RV service was installed near the AFFH building to aid in getting volunteers for AFFH hosts in the future.
- A water measurement device was installed in the AFFH intake line.

## **HATCHERY NEEDS**

- A new residence to replace residence #2, or remodeling and re-roof of that residence.
- Metal siding on the garage for residence #1.
- Metal or vinyl siding on residence #3.
- Repair of the water chiller unit.
- Repair of the automatic feeding system.

## **PUBLIC RELATIONS**

The AFFH received an estimated 5,000 visitors during this period. These consisted of public school groups from March through July, and again in October. We also had scout groups, family reunions, bird watchers, drop-in visitors, hunters, and fishermen. Visitors were noted from nearly every state and various foreign countries. Two major media contacts were made with local television stations and newspapers.

## **CREEL CENSUS**

The AFFH crew ran a creel census on the Snake River from American Falls dam to Eagle Rock. The census was run twice weekly during the entire fishing season.

## **VOLUNTEER PROGRAM**

In an attempt to reduce costs at the hatchery, a volunteer program was tried on an experimental basis in 1997. David and Laurie Kearns were recruited while fishing on the Snake River in August. They were offered a place to park their RV for the remainder of the summer in exchange for light AFFH duties as hatchery hosts. They turned out to be exceptional, mature, interested individuals, who added a great deal of value to the AFFH program. If they return in 1998, as we hope, we will be able to forgo the hiring of a biological aide.

## **HABITAT IMPROVEMENT**

In 1997, as in 1996, part of the AFFH park area was converted to wildlife habitat. Approximately 300 native American plum, Hawthorne, Siberian pea, and crabapple shrubs, and 27 green junipers were planted. A drip system was installed for irrigation. By summer's end, songbirds and pheasants were found in the planting.

## **ACKNOWLEDGMENTS**

This year employees at AFFH were: Bill Doerr, Hatchery Manager I; David Billman, Assistant Fish Hatchery manager; Todd Garlie, Fish Culturist; and Geoffrey Godfrey who served 3-months as a Biological Aide.

Appendix I. Total Fish Stocked and Transferred, 1977, American Falls Fish Hatchery

Region	Species	Number	Pounds	Destination
Panhandle	Hayspur rainbow	\$221,903.00	14,388	Clark Fork Hatchery
Clearwater		\$-	-	
Southwest				
Magic Valley	Kamloops rainbow	\$22,358.00	9,970	Region-wide
Southeast	Kamloops rainbow	\$275,707.00	51,134	Region-wide
Upper Snake	Kamloops rainbow	\$51,362.00	25,660	Region-wide
Salmon		\$-	-	
<b>TOTALS</b>		<b>\$571,330.00</b>	<b>101,152</b>	

Source	Size/type	Pounds	Cost
Rangen	Swimup, Trout & Salmon Starter	339.00	\$196.28
Rangen	Trout & Salmon #1 Dry	720.00	\$416.88
Rangen	Trout & Salmon #2 Dry	1,300.00	\$752.70
Rangen	Trout & Salmon #3 Dry	2,448.00	\$1,417.39
Rangen	Trout & Salmon #4 Crumble	4,842.00	\$1,496.18
Rangen	Trout & Salmon #5 Crumble		
Rangen	Extruded 450 Sinking 1/8	92,990.00	\$31,616.60
Silver Cup	Dry Starter		
Silver Cup	#1 Salmon Fry		
Silver Cup	#2 Salmon Fry		
Silver Cup	#4 Salmon Dry		
Silver Cup	#5 Extra Coarse Crumble		
Silver Cup	5/32 Pellets, Vitamin Boosted		
Silver Cup	3/32 Medicated W/Oxytet		
<b>TOTALS</b>		<b>102,639.00</b>	<b>\$35,896.03</b>

Feed Costs for 1997, American Falls Fish Hatchery

<b>Source</b>	<b>Size/type</b>	<b>Pounds</b>	<b>Cost</b>
Rangen	Swimup, Trout & Salmon Starter	339.00 \$	196.28
Rangen	Trout & Salmon #1 Dry	720.00 \$	416.88
Rangen	Trout & Salmon #2 Dry	1,300.00 \$	752.70
Rangen	Trout & Salmon #3 Dry	2,448.00 \$	1,417.39
Rangen	Trout & Salmon #4 Crumble	4,842.00 \$	1,496.18
Rangen	Trout & Salmon #5 Crumble		
Rangen	Extruded 450 Sinking 1/8	92,990.00 \$	31,616.60
Silver Cup	Dry Starter		
Silver Cup	#1 Salmon Fry		
Silver Cup	#2 Salmon Fry		
Silver Cup	#4 Salmon Dry		
Silver Cup	#5 Extra Coarse Crumble		
Silver Cup	5/32 Pellets, Vitamin Boosted		
Silver Cup	3/32 Medicated W/Oxytet		
<b>TOTALS</b>		<b>102,639.00 \$</b>	<b>35,896.03</b>

**IDAHO DEPARTMENT OF FISH AND GAME**

**ANNUAL REPORT  
ASHTON FISH HATCHERY  
1997**

**Mel Sadecki  
Fish Hatchery Manager I**

**Steve Wingert  
Assistant Fish Hatchery Manager**

## INTRODUCTION

Ashton Fish Hatchery (AFH) is located in Fremont County, Idaho, and approximately two miles southwest of the small community of Ashton. Constructed in 1920, and funded by fishing license dollars, AFH serves as a "specialty station," rearing six species/strains of trout, char and grayling these being, rainbow trout *Oncorhynchus mykiss*, Colorado rainbow trout, cutthroat trout *O. clarki*, brook trout *Salvelinus fontinalis*, golden trout *O. aguabonita*, and Arctic grayling *Thymallus arcticus*.

The majority of fish produced at AFH are fry and fingerling (1 to 6 inches) that are distributed throughout Idaho as part of various put-grow-and-take management programs. Catchable size fish (6 to 10 inches) are also reared at Ashton and distributed locally in waters managed on a put-and-take basis.

## FISH PRODUCTION

### General Overview

A total of 556,264 fish (54,661 pounds) were produced at AFH this year, consisting of 407,866 fingerlings (7,310.7 pounds), and 148,398 catchable sized fish (including holdovers) (47,350 pounds). The total number produced was down from last year, while the total pounds produced increased (Appendix 1). The majority of fish requests were met. Production cost (excluding capital outlay and fish transport) was \$85,288.89, with \$12,532.66 spent on fish feed and the remaining \$72,756.23 spent on general AFH operations and personnel cost. Fish transportation cost was \$5,424.00 for 1997. The average cost per pound of fish produced was \$2.03 (Appendix 1).

Most of the fish reared at Ashton were received as eyed eggs (Appendix 2). Ashton was not able to produce enough catchables to meet regional needs, so it was necessary to bring in catchables from Nampa Fish Hatchery.

All fry and fingerlings were fed by automatic belt feeders that dribbled feed into the tanks and raceways 8 to 10 hours per day. Human disturbance was kept to a minimum, and conversions improved over hand feeding techniques.

Demand feeders were utilized in outdoor raceways for the catchables and holdovers. Feed conversion for catchables and holdovers was 1.07 in 1997 (Appendix 3). Waste settling areas were created in the lower 15% of the outside raceways, which served to settle fish waste for removal before it floated through the lower fish. Lights over the nursery tanks were adjusted to a moderate intensity, and growth rates were maintained by the use of automatic fry feeders and covers when the fish were moved outside to the small raceways.

The average survival for all fish stocked was 70.7% from eyed egg to distribution.

## **Rainbow Trout**

AFH produced and stocked 67,398 (35,549 pounds) 10-inch catchable rainbow for distribution into area lakes and streams (Appendix 1). In addition, Nampa Fish Hatchery transferred in 12,912 (4,612 pounds) catchable rainbow trout to meet regional requests. In November 1996, we received 69,875 Hayspur rainbow trout eggs and in December 128,000 Hayspur rainbow trout eggs. From these eggs, 56,907 Hayspur rainbow trout fingerlings, averaging 3 inches, were planted in a number of Upper Snake Region streams. An additional 81,000 (11,800 pounds) of 7.2-inch Hayspur rainbow trout holdovers were produced for stocking in 1998.

### **Colorado Rainbow Trout**

A total of 27,777 Colorado Rainbow Trout eggs were received from Hayspur Fish Hatchery in December. A total of 19,154, 3.1-inch Colorado rainbow trout were stocked in the Salmon River in the autumn of 1997.

### **Henrys Lake Cutthroat Trout**

Henrys Lake Fish Hatchery shipped 40,698 cutthroat trout eggs to AFH in 1997. From these, 29,980 (87 lbs) of fingerling were planted in Sublette Reservoir, Sand Creek Pond #4, Henrys Lake and Blue Creek Reservoir.

### **Brook Trout**

In 1996, 533,435 green brook trout eggs were received from Henrys Lake Fish Hatchery. An eye up rate of 80% resulted in 428,050 eyed eggs for 1997 requests. From these eggs 204,434 (5,620 lbs) fingerlings averaging 4.2 inches were stocked in Henrys Lake during October. The remaining 45,237 fingerlings were stocked in Region 5.

### **Golden Trout**

Golden trout are reared at AFH whenever eggs are available. No eggs were available this year, however.

### **Arctic Grayling**

Arctic grayling are reared at AFH for statewide mountain lake stocking. In May 1997, green eggs totaling 184,000 were transported to AFH from Meadow Lake, Wyoming. The eggs were placed in five upwelling incubators. Eye-up was good (approximately 70%), resulting in 128,800

eyed eggs. Fry were fed 0.4 mm Bio-Kyowa larval fish feed for the first four weeks then switched to Rangen's swim-up. Growth and survival remained good throughout the rearing period. A total of 52,154 fry (5.75lbs) were transferred or stocked during the summer of 1997.

## **HATCHERY IMPROVEMENTS**

This year the drainage ditch behind residence #2 was cleaned out, the trees near residence #2 were trimmed and the fence behind residence #1 was repaired and painted.

Future needs include construction of a large storage area, heated shop/garage east of the Quonset hut, siding and windows for the three-car garage; septic tank/field work will be needed for both residences and a new concrete driveway for residence #1.

## **FISH STOCKED AND TRANSFERRED**

The AFH's stocking program remained similar to last year's program, with only minor changes (Appendix 4). The availability of golden trout eggs was the most obvious change. Numbers of catchable rainbow trout on station were not sufficient to meet requests, requiring us to transfer in 12,912 fish from Nampa Fish Hatchery. The only fish transferred from AFH to other facilities in 1997 were Arctic grayling.

## **ASHTON FISH SPAWNING**

The AFH personnel traveled to Henrys Lake Fish Hatchery to sort and spawn cutthroat trout, rainbow x cutthroat hybrids, and brook trout.

## **FISH FEED**

A total of 36,942 pounds of fish feed were fed (Appendix 5) to produce 41,922 pounds of gain (Appendix 1), for an average conversion of 0.88. All fish were initially fed BioDiet because of the superiority and performance of the feed. Catchable brook trout and holdover rainbow trout were switched to less expensive Rangen's dry diet when they reached fingerling size, holdovers were fed Silver Cup, while other varieties were fed BioDiet until they were stocked. Arctic grayling were started on Bio-Kyowa larval fish feed and switched to BioDiet.

## **PUBLIC RELATIONS**

Approximately 4,000 people visited AFH this past year. About 1,500 elementary students from as far away as Idaho Falls visited the AFH last spring, summer, and fall. Our visitor information center answers questions about the AFH, fishing and hunting regulations, and various

Idaho Department of Fish and Game (Department) policies. A color-coded map is designed to show where hatchery fish are stocked.

Fishing was again allowed in the AFH settling pond for kids 12 and under on Free Fishing Day. The Forest Service provided signs and personnel to assist the AFH crew in showing the kids how to fish. The Upper Snake Region fishery personnel provided bait, hooks, bobbers, and fishing poles for the event, while conservation officers help teach ethics and laws to the kids. Area businesses provided hot dogs, buns, condiments, and soft drinks for participants. About 250 kids took advantage of free fishing, and all caught fish. The largest fish caught weighed 12 pounds, with 15 to 20 additional fish in the 3 to 5 pound range.

## **SPECIAL PROJECTS**

### **Fish Marking**

Adipose clips were given to 20,000 of the 204,434 brook trout stocked in Henrys Lake.

### **Regional Efforts**

Employees were involved in sharptail and sage grouse lek counts. The AFH personnel assisted with firearms training for Hunter Education in Ashton and worked two days at the big game check station. The AFH personnel also ran the Free Fishing Day program here at the hatchery.

## **HENRYS LAKE HATCHERY**

### **FISH SPAWNING**

The 1997 cutthroat trout run consisted of 5,844 cutthroat and 2,410 hybrid trout totaling 8,254 fish. Cutthroat males numbered 3,172 and cutthroat females numbered 2,672, Hybrid males numbered 633, and 1,747 females were counted. Average length for male cutthroat was 443 mm and females averaged 439 mm total length. Combined average cutthroat total length was 441 mm. Hybrid trout males averaged 480 mm and females averaged 468 mm. Combined male and female hybrid trout average length was 472 mm total length.

Cutthroat green eggs totaled 2,218,680 from 1047 females for an average fecundity of 2,119 eggs per female. Eyed cutthroat trout eggs totaled 1,651,182 for an eye up of 74.4%.

Hybrid trout green eggs totaled 1,611,800 from 907 female cutthroat for an average fecundity of 1,777 eggs per female. Eyed hybrid trout eggs totaled 1,236,760 for an eye up of 76.7%

The 1997 brook trout spawning operations started on October 10 with the installation of the ladder and continued until November 14. Morpholine was used to imprint brook trout in previous years and a drip system was initiated into the spawning facility on October 3. Gametes were taken and bagged into pools of five at Henrys Lake Fish Hatchery. Oxygen was added to the milt bags and all were transported to the AFH in coolers. At AFH ovarian fluid was taken, the eggs were fertilized, disinfected, measured, and placed into Heath stacks.

A total of 1,672 brook trout ascended the fish ladder. Male brook trout totaled 920 and females totaled 669. Male brook trout averaged 293 mm total length and female brook trout averaged 314 mm total length for a combined male and female brook trout average length of 305 mm total length.

Brook trout green eggs totaled 641,234 from 401 females for an average fecundity of 1,599 eggs per female. Eyed eggs totaled 485,913 for an eye up of 75.8%.

### **HATCHERY IMPROVEMENTS**

This year at the Henrys Lake Hatchery grounds the residence and the public restroom were painted, a deck was build onto the front of the cabin, the trees were trimmed, and a retaining wall was built along the sidewalk to the office. The Ground Fault Circuit Interrupter (GFCI) outlets were installed in the cabin and the incubation room. The spawning shed had a false ceiling installed, the fish release pipe was rerouted and ladders were installed along the walkways. On Duck Creek the old wooden posts were replaced with drilled fiberglass posts. Two screens on Howard Creek were removed and taken to the Salmon screen shop for repairs.

### **CREEL CENSUS**

An intensive creel survey was conducted this year from May 24 to October 31. Boat counts were done twice each day on 50% of the days. Effort was higher than in previous years with 235,655 angler hours spent on the lake. A total of 32,735 fish were kept and 125,514 fish were released for a release rate of 74% for all species. Cutthroat made up 61% of the catch and 48% of the harvest while Hybrids made up 34% of the catch and 48% of the harvest. Brook trout accounted for 5% of the catch and 4% of the harvest. The overall catch rate was .54 fish per hour.

### **RIPARIAN FENCING**

The riparian areas of the creeks and of the lake itself were maintained as in past years. An additional fork of Targhee Creek was surveyed and plans made to include it next year in the existing riparian enclosure.

## **FISH SCREENS**

The fish screens on the tributaries around Henrys Lake were maintained as in previous years. A plan is being implemented to do needed routine maintenance on a couple of screens each year as funding allows.

## **APPENDICES**

Appendix 1. Fish production and cost, Ashton Fish Hatchery, 1997

Species	Size	Number Fish	Pounds Planted	Weight Gained In 1997	Cost/lb	Cost/fish	Total Cost
Fingerlings Produced and Stocked							
Colorado Rainbow	3.4	19,154	235.25	228.2	\$7.44	\$0.09	\$1,697.00
Hayspur Rainbow	3.4	56,907	877.00	852.6	\$6.13	\$0.09	\$5,228.00
Henrys Lk Cutthroat	2.0	29,980	87.00	74.5	\$31.70	\$0.08	\$2,362.00
Brook trout	4.3	249,671	6,105.70	6,018.8	\$4.20	\$0.10	\$25,298.00
Arctic Grayling	1.0	52,154	5.75	5.0	\$800.00	\$0.08	\$4,000.00
<b>Totals/Average</b>	<b>3.0</b>	<b>407,866</b>	<b>7,310.70</b>	<b>7,179.1</b>	<b>\$4.95</b>	<b>\$0.09</b>	<b>\$35,585.00</b>
Catchables Produced and Stocked							
Hayspur rainbow	9.5	67,398	35,549.00	22,942.0	\$1.24	\$0.42	\$28,495.00
<b>Totals/Average</b>	<b>9.5</b>	<b>67,398</b>	<b>35,549.00</b>	<b>22,942.0</b>	<b>\$1.24</b>	<b>\$0.42</b>	<b>\$28,495.00</b>
Hayspur rainbow	7.5	81,000	0.00	11,801.0	\$1.54	\$0.22	\$18,229.00
<b>Totals/Average</b>	<b>7.5</b>	<b>81,000</b>	<b>0.00</b>	<b>11,801.0</b>	<b>\$1.54</b>	<b>\$0.22</b>	<b>\$18,229.00</b>
<b>Grand Totals</b>		<b>556,264</b>	<b>42,859.70</b>	<b>41,922.1</b>	<b>\$2.03</b>	<b>\$0.15</b>	<b>\$85,289.00</b>

Appendix 2. Eggs and fish received and transferred during 1997, Ashton Fish Hatchery

Species	Eggs Received	Fish Received	Fish Transferred	Destination
Arctic Grayling	128,800	0	50,154	Statewide
Hayspur rainbow	<sup>a</sup> 191,342	0	0	Region 6
Brook trout	<sup>a</sup> 485,913	0	0	Henrys Lake
Henrys Lake cutthroat	40,698	0	0	Region 6
Kamloops (K1)	0	12,912	0	Region 6
<b>TOTALS</b>	<b>846,753</b>	<b>12,912</b>	<b>50,154</b>	

<sup>a</sup>stocked as feeding fry

Appendix 3. Comparative growth rates, feed conversion and percent survival for all species reared at Ashton Fish Hatchery, 1997

Species	Average monthly Length increase	Average Conversion	Percent Survival
Rainbow (catchables)	0.53	1.12	92.2
Rainbow (fingerlings)	0.53	0.84	81.4
Brook trout	0.46	0.90	72.3
Colorado rainbow	0.35	0.88	68.9
Cutthroat	0.62	1/16	73.6
Arctic grayling	0.12	3.60	40.5
<b>Holdover for 1997 stocking</b>			
Rainbow	0.55	1.03	66.1

Appendix 4. Origin of fish stocked or transferred in 1997, Ashton Fish Hatchery

Size	Source	Pounds	Cost/lb	Total Cost
B-400 larval	Biokyowa	2.2	41.36	\$91.00
Swimup	Rangens	200	0.7795	\$155.91
#1 Starter	Rangens	294	0.7773	\$228.53
#2 Starter	Rangens	1,300	0.6217	\$808.30
#3 Starter	Rangens	5,000	0.59	\$2,950.00
2.0 mm pellet	Silver Cup	1,450	0.38	\$551.00
3.0 mm pellet	Silver Cup	8,646	0.27	\$2,334.42
4.0 mm pellet	Silver Cup	20,050	0.27	\$5,413.50
<b>TOTALS</b>		<b>36,942.20</b>		<b>\$12,532.66</b>

Appendix 5. Feed used at Ashton Fish Hatchery

Size	Source	Pounds	Cost/lb	Total Cost
B-400 larval	Biokyowa	2.2	41.36	\$91.00
Swimup	Rangens	200	0.7795	\$155.91
#1 Starter	Rangens	294	0.7773	\$228.53
#2 Starter	Rangens	1,300	0.6217	\$808.30
#3 Starter	Rangens	5,000	0.59	\$2,950.00
2.0 mm pellet	Silver Cup	1,450	0.38	\$551.00
3.0 mm pellet	Silver Cup	8,646	0.27	\$2,334.42
4.0 mm pellet	Silver Cup	20,050	0.27	\$5,413.50
<b>TOTALS</b>		<b>36,942.20</b>		<b>\$12,532.66</b>

**IDAHO DEPARTMENT OF FISH AND GAME**

**ANNUAL REPORT**

**CABINET GORGE FISH HATCHERY**

**1997**

**Bradford W. Dredge  
Fish Hatchery Manager I**

**Bruce Thompson  
Assistant Fish Hatchery Manager**

## INTRODUCTION

Cabinet Gorge Fish Hatchery (CGFH) is located on the south bank of the Clark Fork River in Bonner County, Idaho approximately eight miles southeast of the community of Clark Fork. The CGFH was constructed in 1985 and was co-funded by Washington Water Power (WWP), Bonneville Power Administration (BPA), and Idaho Department of Fish and Game (Department). The primary purpose for CGFH is to produce late-spawning kokanee salmon *Oncorhynchus nerks kennerlyi* fry for release into Idaho's Lake Pend Oreille. Kokanee fry are needed to mitigate for the loss of wild kokanee recruitment caused by hydroelectric power projects in the Pend Oreille watershed. The kokanee fry released is timed to coincide with cycles of zooplankton blooms.

The CGFH is staffed with two permanent employees. Thirty-three months of temporary labor are available for use during the year. Housing accommodations include two residences for the permanent staff and crew quarters for two temporary employees.

### Water Supply

Cabinet Gorge Dam is located about one mile upstream from the CGFH. After its completion in 1952, artesian springs began appearing along the Clark Fork River at the present site of the hatchery. The CGFH water supply consists of approximately 4.4 cfs from a spring and approximately 20 cfs from a well field. The temperatures of the lower spring and upper well field vary inversely with each other over a 12-month period. The cooler water from the lower springs (pump #7 and #8) was utilized to incubate eggs until January 16, 1997. At that time, a mixture of the two water sources allowed incubation and early rearing water temperatures to be maintained around 50°F (range 48.1°F to 52.5°F). Production water ranged from 39.9 °F to 45.6°F.

The CGFH utilizes six pumps to move water to a common headbox. The lower spring and upper well field water serves the 31,000 cf of rearing space in the hatchery building and the 1,500 cubic feet (cf) of space in the adult holding ponds.

### Rearing Facilities

Rearing facilities at the CGFH include 192 upwelling incubators and 64 concrete raceways. The incubators are 12 inches in diameter by 24 inches high with a maximum capacity of 140,000 kokanee eggs each. The 64 concrete raceways have rearing space of 31,000 cf. The hatchery building encloses approximately one-third of each raceway. The adult kokanee holding area consists of two holding ponds (10 ft by 30 ft each) at the head of the fish ladder. Additional adult holding is available in three holding ponds (10 ft by 30 ft each).

## **PRODUCTION**

Between January 1, 1997 and December 31, 1997, CGFH produced a total of 3,746,571 fish weighing 8,363 pounds (Appendix 1). On January 1, 1998, a total of 601,661 Lake Pend Oreille kokanee eggs and newly hatched fry were on hand (Appendix 2). In addition, a total of 101,115 fall chinook salmon, 180,404 kamloop trout, and 1,003,378 rainbow trout eggs and newly hatched fry were on hand.

A total of 8,594 pounds of feed produced 7,510 pounds of gain for an overall feed conversion of 1.14. Total production cost (less capital outlay) was \$223,820, resulting in a cost per pound of fish of \$26.76, cost per inch of fish of \$0.0311, and \$59.74 per thousand fish (Appendix 1).

### **Lake Pend Oreille Kokanee**

#### **General Rearing**

Fertilized eggs were brought to the CGFH and disinfected in 100 ppm PVP iodine for 15 minutes. After enumeration by volumetric displacement, the green eggs were placed into upwelling incubators and rolled until eye-up. At eye-up the eggs were shocked and sorted and counted with the Jensorter JHC-114 model sorter. Fry were allowed to swim out of the incubators into the raceways at 1,550 to 1,580 temperature units. All fry were thermally mass marked via temperature manipulation in the raceways. Feed training began at 1,680 to 1,720 temperature units.

Kokanee were feed trained at approximately 50°F using Rangen's Trout and Salmon starter for 17 days. Feed training continued from the 18<sup>th</sup> day to the 34<sup>th</sup> day utilizing a 50:50 mix of Trout and Salmon starter and Trout and Salmon starter #1. On day 35 the fry were placed on Trout and Salmon starter #1 only. The fry remained on Trout and Salmon starter #1 until they reached an average size of 800 fish per pound. The fry were then placed on Trout and Salmon starter #2 for the remainder of the rearing season. Release size objectives have changed from about 1.3 fry inches (1986) when the CGFH began operations to the present request of a 2 inch average size at release. To meet the request, the CGFH capacity has been reduced from 30 million fry to 16 million fry.

Egg collection lasts over two months, and a cross-section of the run is required for each release strategy. Growth rates were not manipulated during the 1997 season to achieve a universally sized 2-inch fry. The fish were reared using 42 monthly temperature units per inch of growth. For the third consecutive season, fish were not taken off feed or overfed to attain the average 2-inch size parameter at release. After approximately 6 weeks of feed training, the fry were extended in the raceway, and water temperatures were lowered to emulate natural production in Lake Pend Oreille. It should be noted that during the spring and early summer of 1997 the Clark Fork River rose to unusually high levels. On May 14, 1997 flows in the Clark Fork River exceeded 115,000 cfs and the lower springs pumping station was shut down and the pumps were removed. The river continued to rise and peaked at approximately 139,000 cfs. The overall effect was that the average incubation and production water temperatures dropped from 49.3°F to 40.1°F and from 45.6°F to 40.1°F, respectively. The overall decrease in

temperature resulted in a slightly smaller average size at release of 465 fish per pound (331 fish per pound in 1996).

A total of 3,722,167 kokanee fry were produced at an average length of 1.93 inches and an average weight of 465.13 fish per pound. These fish gained 7,352 pounds from 8,471 pounds of feed, resulting in a conversion rate of 1.15:1.0. Fish feed production cost was \$27.57 per pound, \$0.0307 per inch, and \$59.27 per thousand.

Survival of green eggs to feeding fry was estimated at 83.9% (1996, 88.2%). Survival from first feeding to release was estimated at 98.8% (1996, 98.0%), resulting in survival from green egg to release of 82.9% (1996, 85.5%).

## **Fish Marking**

To evaluate the success of a kokanee stocking program in Lake Pend Oreille, an otolith thermal mass marking (Volk, et al., 1990) program was initiated at CGFH. All kokanee fry received a thermally induced otolith pattern.

Otolith marking normally occurs between eye-up and button-up stages, but plumbing at CGFH precluded normal procedures due to its inability to accommodate supplying two water sources of different temperatures to the incubating eggs and sac fry. The incubation vessels, however, allowed for volitional swim-up of fry into separate rearing raceways, which were plumbed to accommodate a Tmarking program. This situation provided the impetus to attempt Tmarking fry at the end of button-up.

Analysis of pre-release voucher specimens (Grimm, et al., 1997) verified the presence of a recognizable otolith mark on all thermally treated fry. Although there was significant variability in the expression of the Tmark, ambiguous marks could be confirmed by carefully observing incremental patterns at the measured area where the Tmark was expected to occur.

Two factors contributed to the success of the Tmarking and recovery of the Tmarks. The first was the ability to manipulate water sources separately in each raceway without affecting the water in the other raceways. The second was the small (less than seven days) spread of the egg takes that were in each raceway. These factors allowed CGFH personnel to thermally treat groups of fry that collectively were at the same developmental stage. That is important because it places the otolith pattern in relatively the same geographic region of the otolith, making examination for and recovery of the mark much easier.

The Tmarks were recoverable but more variably expressed than expected. Some were very clear and easy to see while some were more cryptic. Creating and recovering the Tmark for the 1996 CGFH kokanee brood was successful. Adjustments to spacing between thermal events will be made to the 1997 brood Tmarking effort to create artificial patterns less similar to natural daily increments patterns.

Trawl surveys in Lake Pend Oreille were conducted on September 29 to October 4, 1997. Fry were collected from three areas of the lake. All age zero fry collected were sent to the Washington Department of Fish and Wildlife otolith lab for analysis. By examining their otolith (earstones), they were able to determine wild fry from hatchery fry. Hatchery fry made up

53% of the sample while wild fry made up the remaining 47%. Trawl results from the three collections are listed below:

<u>Sample</u>	<u>Marked</u>	<u>Unmarked</u>	<u>Total</u>	<u>% Marked</u>
S1	45	78	123	37
S2	54	25	79	68
S3	69	47	116	59
Totals	168	150	318	53

The success of the program has been encouraging. The most beneficial part of the program is that it is cost effective. A total of 3.7 million fry were Tmarked and no additional costs were required. In the next two years it will be possible to improve estimates of this year class of fish in Lake Pend Oreille.

### **Fish Liberation**

On July 2, 1997, 1,004,687 fish were released from the CGFH into the Clark Fork River. On June 25-26, 1997, 2,716,010 kokanee fry were released into Sullivan Springs.

Numbers at release were based upon Jensorter counter/sorter inventory numbers at eye-up minus mortality. All fish were off feed for three full days before inventory pound counts were taken. Pound counts were completed on all raceways one to three days prior to fish being loaded onto the transport vehicles or being released into the Clark Fork River. All raceways were displaced onto the transport trucks during the Sullivan Springs release to double check inventory numbers. Weight displacements were performed to support current fish inventory numbers on hand at the time of release. No weight displacements were conducted prior to releasing the fish into the Clark Fork River via the fish bypass system.

The Clark Fork River release groups were liberated at night directly into the ladder via the fish bypass system. Only three raceways were released at one time. The entire release took less than two hours.

The Sullivan Springs release group was transported in one Department tanker (3,000-gallon capacity). Loading densities of small fish in the tankers was kept below 0.60 pounds per gallon. Fish were planted below the bridge on the access road to the Department patrol cabin. One tanker made four releases during the period of June 25-26, 1997.

## **Other Species**

On February 19, 1997, a total of 22,240 fall chinook salmon were transported from CGFH to the Nampa Fish Hatchery. The fish averaged 880 fish per pound and had attained a length of 1.49 inches.

On May 5, 1997, a total of 132 Kootenai River sturgeon were transported from CGFH to Hagerman National Fish Hatchery (University of Idaho Research Facility). The fish averaged .47 fish per pound and had attained a length of 22 inches.

On June 8, 1997 and June 26, 1997, a total of 600 kamloop trout and 96 westslope cutthroat trout were given to Perimetrics, Incorporated and sacrificed for experimentation. The fish were 25 fish per pound and 26 fish per pound and had attained a length of 4.65 inches and 4.79 inches, respectively.

On July 3, 1997, a total of 1,470 kokanee salmon were planted into Mirror Lake. The fry averaged 3,691 fish per pound and had attained a length of .97 inches. The fry were back-up experimental fish that were not used by University of Idaho researchers. The fry were released into Mirror Lake because they did not receive a thermally induced temperature mark during early rearing.

On July 3, 1997, a total of 1,336 kamloop trout were planted into Hayden Creek. The fish averaged 49 fish per pound and had attained a length of 3.71 inches.

## **HATCHERY IMPROVEMENTS**

### **Repairs and Improvements**

- Occupation Safety and Hazard Administration (OSHA) safety materials purchased in 1995 with capitol outlay funds were installed during the summer of 1997. Most of the project is completed with the exception of the guardrails protecting pumps #7 and #8. High water and the erosion of the bank around pumps #7 and #8 prohibited the project from being completed. Repairs were made around the pumps during the fall of 1997 and the project will be completed during the spring of 1998.
- The generator #2 building (constructed in 1995) and the Generac generator (purchased in 1996) were placed into operation on October 28, 1997. The generator was load tested and operational instructions were confirmed.
- Backyard fencing material (purchased in 1995) was installed during 1997. Both residence #1 and residence #2 have the backyards fully enclosed with fence and gates. The materials replaced a low wooden fence, which was in need of repairs.
- The generator #1 trickle charging system was reinstalled. It had been disconnected in the past and was never repaired and replaced. The disconnection caused the generator batteries to go bad and effected the level of power required for the monitoring panel to

operate effectively. When the power level was reduced to the panel the generator not only would not start but the alarms were inoperational. New batteries (a total of four) were purchased to replace the old batteries.

- Envirosearch removed the 2,000-gallon underground diesel storage tank on August 6, 1997 to comply with changing UST regulations. A new 500-gallon above ground diesel fuel tank was purchased and installed during the fall of 1997. The new tank supplies fuel to both generator #1 and generator #2 independently of one another via generator #1 and generator #2 day tank pumps.
- The raceway #7 wall was repaired. In addition, the concrete slab for the new diesel fuel tank was completed and a power washing concrete slab was poured at the west end of the hatchery building.
- All department vehicles, tractors, and small engines were serviced regularly and repaired as needed.
- Back-up generator #1 was load tested weekly and maintenance checked daily during operations. Generator #2 was operated weekly (with no load) and load tested monthly (with pump #8 only).
- The rain gutters were repaired on residence #1 and residence #2. The heavy snowfall during the winter of 1996-1997 and ice that formed destroyed most of the existing gutters.
- Modifications to the Sullivan Springs/Granite Creek finger weir and dividing weir were completed during the fall of 1997. The finger weir and dividing weir was modified so that pins instead of nuts and bolts or lags could be used. The modification dramatically decreased the time required to remove the two structures.
- New raceway dam boards were purchased with CGFH funds to replace the old, original dam boards.
- All of the CGFH fire extinguishers received annual servicing.
- All of the upwelling incubator raceway hangers were modified to create a stronger, more reliable hanger. An additional piece of metal was welded at the weak point to give it additional strength.
- A new feed storage building was constructed with capitol outlay funding. A total of \$7,000 was available and the building was constructed for less than \$6,000. The building is 16 feet by 20 feet and will house up to 30,000 pounds of feed.
- A new smoke alarm, back board, and medical kit were purchased for the Granite Creek trap to comply with OSHA recommendations.
- Supplies for the new headbox catwalk were received during 1997. The new catwalk will be installed during the summer of 1998. The electrical conduit supplying power to the alarm system needs to be moved and reinstalled before the project can be completed.
-

- The Kubota tractor snowblower attachment was repaired during the summer of 1997.
- Two new file cabinets were purchased during September of 1997.
- A log structure in Sullivan Springs was repaired on October 14, 1997.

## **HATCHERY RECOMMENDATIONS**

Inadequate amounts of available warm water (50°F) during the production month's remains the limiting factor for fish production. Although the upper well field can yield up to 20 cfs, it is too cold during the production cycle. Warmer water from the lower springs must be added to temper the upper well field water. Unfortunately, only 4.4 cfs is available from the lower springs. It has been proposed that an additional pumping station be installed on the lower spring's pipeline to help lift or push the water up to the CGFH headbox. The additional station could add approximately 1.6 cfs of warm water to the current system. The lower springs collects approximately 6 cfs of available water but the means to pump it is unavailable. Currently generator #1 backs up a total of 19.4 cfs (pumps #8, #7, #6, #5, and #4) and a total of 7.2 cfs is backed up by generator #2 (pumps #3 and #8).

## **FISH SPAWNING**

### **Fish Trapping**

The Clark Fork River fish trap was in operation from September 11, 1997 to January 2, 1998. The first adult kokanee entered the trap on October 9, 1997, and trapping and spawning continued through early January. There were 70 adult kokanee trapped. Spawntaking records indicated 50% of the spawning run was female (35). From September 11, 1997 to October 20, 1997 the trap was used to collect and sample bull trout. A total of 15 adult bull trout were trapped. The length of the fish ranged from 530 cm to 770 cm. A total of 6 males and 9 females were trapped. One male mortality was recorded on September 29, 1997. All of the adult bull trout had a tissue sample removed. In addition, all of the adults were tagged with the exception of one female. Two of the females and three of the males were previously marked with a right ventral fin clip.

The Sullivan Springs trap was in operation from October 20, 1997 to December 30, 1997. The Sullivan Springs trap collected 16,134 adult kokanee salmon. Of these, 6,320 adults were passed above the trap to spawn naturally in Sullivan Springs Creek. Spawntaking records showed that 24.75% of the run was female.

### **Spawntaking and Eggs Received**

Clark Fork River kokanee spawntaking began on November 26, 1997 and continued to January 2, 1998. Spawntaking activities occurred from November 5, 1997 to December 19, 1997 at the Sullivan Springs collection facility.

A total of 601,661 green fertilized kokanee eggs were collected during the 1997-1998 spawning season. Of those, 7,851 (3,300 in 1996) were obtained from 35 female kokanee at CGFH, and 593,810 (4,047,811 in 1996) were obtained from 2,241 female kokanee at the Sullivan Springs trap.

### **FISH FEED**

The fish produced during 1997 were fed a total of 8,594 pounds of feed. All fish feed was acquired from Rangen's Inc. The overall conversion was 1.14 pounds of feed to produce one pound of fish, not including the weight of mortality (Appendix 2).

### **PUBLIC RELATIONS**

The surrounding communities recognize the CGFH as the major contributor of kokanee to the Lake Pend Oreille fishery. The importance of this local fishery to the local economy is presently estimated at over five million dollars. The CGFH has been the focus of many radio, television, and newspaper stories in recent years. With the decline of kokanee numbers in recent years, even more attention is focused on the CGFH. Because of the popularity of the lake and its attractions, tourism is a booming business, and we have people from all over the world visiting the CGFH.

A total of 557 people signed our guest registration book this year. An estimated 700 visitors toured the CGFH during the 1997 season. In addition, tours were given to school groups and other organizations.

The CGFH held an open house on April 19, 1997. It was the first open house since the CGFH went into operations back in 1986. A total of 125 people toured the CGFH on that Saturday. Most of them were local residents from the Northern Idaho, Western Montana, and Eastern Washington.

### **ACKNOWLEDGMENTS**

The CGFH staff would like to thank the Cabinet Gorge Dam personnel for their continued cooperation with hatchery operations. Thanks also to the Lake Pend Oreille Idaho Club, Bonner County Sportsmen's Association, numerous volunteers, and various regional and hatchery Department personnel for their cooperation during the spawning season.

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Appendix 1. Production summary for Cabinet Gorge Fish Hatchery, all species, 1997.

Species	Number	Pounds	Length	Feed		Annual	Cost/lb	Cost/1000	Cost/inch	Conversion	
				Fish/lb	Fed						Fed
PDO kokanee	3,722,167	8,002	1.93	465	8,471	\$5,421.44	\$220,616.62	\$27.57	\$59.27	0.0307	1.15
Fall chinook	22,240	25	1.49	881	14	\$8.64	\$351.59	\$13.92	\$15.81	0.0106	1.06
Kootenai sturgeon	132	281	21.99	0.47	60	\$38.08	\$1,549.60	\$5.51	\$11,739.42	0.5339	0.55
Cutthroat trout	96	4	4.79	26	3	\$1.73	\$70.32	\$19.06	\$732.48	0.1529	0.83
Kamloop trout	1,936	51	4.04	38	47	\$30.27	\$1,231.87	\$24.15	\$636.30	0.1575	1.09
<b>Totals/Average</b>	<b>3,746,571</b>	<b>8,363</b>	<b>1.92</b>	<b>448</b>	<b>8,594</b>	<b>\$5,500.16</b>	<b>\$223,820.00</b>	<b>\$26.76</b>	<b>\$59.74</b>	<b>0.0311</b>	<b>1.14</b>

Appendix 2. Lake Pend Oreille kokanee spawntaking summary, 1997.

Spawntaking site	Total fish	Females spawned	Green eggs	Fecundity	Percent females
Sullivan Springs	16,134	2,241	593,810	265	24.80%
Cabinet Gorge	70	35	7,851	224	50.00%
<b>Totals/Average</b>	<b>16,204</b>	<b>2,276</b>	<b>601,661</b>	<b>264</b>	<b>24.90%</b>

Total fish includes male/female prespawn mortality.

**IDAHO DEPARTMENT OF FISH AND GAME**

**ANNUAL REPORT**

**CLARK FORK FISH HATCHERY**

**1997**

**John Thorpe  
Fish Hatchery Manager II**

**David Beers  
Assistant Fish Hatchery Manager**

**Dwight Aplanalp  
Fish Culturist**

**INTRODUCTION**

The Clark Fork Fish Hatchery (CFFH) is a resident species hatchery located on Spring Creek, 1.5 miles northwest of Clark Fork, Idaho. Approximately 15,000 westslope cutthroat trout *Oncorhynchus clarki lewisi* broodstock are held on station, providing the state's largest captive source of westslope cutthroat eggs. In addition to westslope cutthroat, brook trout *Salvelinus fontinalis*, brown trout *Salmo trutta*, golden trout *O. aguabonita*, Kamloops rainbow trout *O. mykiss*, Arctic grayling *Thymallus arcticus*, and kokanee *O. nerka kennerlyi* are reared for distribution in the waters of the Panhandle Region. A target goal of 125,000 rainbow trout >9 inches are distributed to the put-and-take fishery from March through October. For the 1997 plants, 35,163 of these trout were transported from production hatcheries in southern Idaho, and 108,216 fish were grown locally. Originally constructed by the Work Project Administration in 1934 and completed in 1938, the CFFH is now funded for operation by Idaho Department of Fish and Game (Department) license fees. Water diverted from Spring Creek provides for incubation and rearing, with flows of 8-15 cubic feet per second (cfs) at temperatures averaging 41°F in winter and 48°F in summer. A well provides approximately 100 gallons per minute (gpm) of 45°F water to one bank of incubators. The well water can be directed to fiberglass rearing troughs and concrete vats or mixed with Spring Creek water in the head box. Rearing units include Heath incubator stacks, concrete and fiberglass early rearing vats, concrete raceways, and earthen broodstock ponds.

## FISH PRODUCTION

Trout production at the CFFH now addresses four different objectives: 1) maintenance of a captive westslope cutthroat trout broodstock of 15,000 adults to spawn at age 4 and 5 years; 2) production of 288,500 westslope cutthroat trout and 270,000 domestic Kamloops trout to six inches or greater for large lake stocking; 3) rearing 60,000 westslope cutthroat trout and various other salmonid species to less than three inches for release in mountain and lowland lakes; and 4) rearing 140,000 rainbow trout for the put-and-take fishery in the Panhandle Region (Appendix 1). Eggs are collected on station (Appendix 2), as well as received from public and private sources.

The broodstock management plan had been altered over the past several years to better serve changing management programs. The broodstock population is an adfluvial strain of westslope cutthroat originally obtained from north Idaho waters. Eggs were collected from May 12 to June 2 1997. The spawning operation was stopped after two million eggs had been collected although additional ripe females remained. Current protocol includes a final spawn session where all females are stripped to remove ripe eggs. The average length of the broodstock population observed in 1996 was 11.9 inches (range 10.75-14.5 inches).

During 1997, 106,734 (14,695 lbs) BY95 six-inch plus westslope cutthroat trout were released. As in previous years, 100,028 (4,000 lbs) BY95 6-inch westslope cutthroat trout were stocked into Hayden Lake in September. Growth rates up until this year have continued to improve, producing the same 6-inch fish earlier each season. In September, 302,268 (6,875 lbs) of domestic Kamloops rainbow trout were released into Hayden Lake.

The mountain lake stocking programs utilized Arctic grayling, westslope cutthroat trout, and domestic Kamloops fry from BY97. Lakes in the Panhandle and Clearwater regions received 980 (2.0 lbs) Arctic grayling, 50,725 (39.32 lbs) westslope cutthroat trout and 7,027 (16

lbs) domestic Kamloops rainbow trout. Lowland lakes were stocked with 22,818 (692 lbs) Henrys Lake brook trout.

There were 180,496 (60,719 lbs) rainbow trout >9 inches long stocked or transferred by the CFFH in 1997. Of these, 138,906 (37,031 lbs) trout were reared from eggs on station, while another 41,590 were transferred in from the American Falls Fish Hatchery and Nampa Fish Hatchery.

Annual costs to rear fish from CFFH are listed in Appendix 3. The total cost to rear fish for 1997 was calculated by averaging the FY96 and FY97 budgets to obtain a cost for calendar year 1997. The costs at Clark Fork included transportation of all put-and-take rainbow trout to the Mullan Hatchery for redistribution. The cost to rear fish on station and additional costs incurred to deliver these fish to the release site are separated in Appendix 3.

### **HATCHERY IMPROVEMENTS**

The major facility improvement was modification to the pond screening on broodstock, large and small outdoor raceways to minimize bird predation. The CFFH personnel completed all modifications. New stainless steel aircraft cable support wires were permanently mounted from hooks anchored in the raceway walls on the large raceways. It is expected that these supports should bear the heavy snow load weights that we experience. Galvanized iron pipe supports were manufactured from salvaged pipe to support covers over the small raceways.

- There were no funds for construction repairs or modifications during 1997.
- Major construction needs include:
- A high priority requirement for a pump and piping to supply pathogen-free water for rearing broodstock, eggs, and fry from the well, drilled in 1989, that tested at 1,000 gpm and then was capped.
- Construction of concrete broodstock ponds to replace the earthen ponds now in use.
- The construction of a heated, weather-tight garage for storage of vehicles and grounds maintenance equipment. The requirement for a covered area for vehicle maintenance still exists. At this time, repairs and modifications on truck-size vehicles must be performed out in the open without even a paved surface under the vehicle.

### **FISH STOCKED AND TRANSFERRED**

The CFFH program distributes fish in the Panhandle Region as directed by Department fishery management. The program includes distributing rainbow trout for put-and-take fisheries; distributing brown, brook, and cutthroat trout fingerlings for put-grow-and-take fisheries; distributing brook, cutthroat, golden, and Kamloops trout fry and Arctic grayling to remote sites; and redistributing warm and cool water game fish into the Panhandle Region.

The CFFH personnel stocked 149,806 (50,869 lbs) size three (>9 inches) rainbow trout to waters of the Panhandle Region, north of Coeur d'Alene, from March to October 1997. Of these, 35,163 (13,589 lbs) trout were received from the American Falls Fish Hatchery, 6,427(1,634 lbs) were received from the Nampa Fish Hatchery, and 114,643 (37,680 lbs) trout were reared from egg to release at the CFFH and stocked to the put-and-take fishery. In 1997, 30,690 (9,850 lbs) rainbow trout were reared for release from the Mullan Hatchery.

Releases of Arctic grayling, westslope cutthroat trout, and Kamloops rainbow trout were delivered to 22 mountain lakes by backpack and US Forest Service helicopter this year.

There were no westslope cutthroat trout transferred for rearing in net pens on Lake Pend Oreille in 1997. Prior to last season, survival and growth in net pens had been significantly better than at the hatchery. Losses to otter predation of up to 100% in net pens during the 1996-1997 season were deemed unacceptable. The intention at present is to suspend net pen rearing until the predators relocate.

## **FISH SPAWNING**

The CFFH maintains a captive westslope cutthroat trout broodstock population to provide for needs within the Panhandle Region. Inability to maintain a disease-free population prevents transfer of eggs or fish to other regions. Presently, approximately 15,000, two to four-year-old brood fish are held to spawn in their fourth and fifth year. This provides a potential for taking two million green eggs, yielding from 1 to 1.5 million eyed eggs. During past years, the egg requirement has varied substantially. Fish requirements have ranged from over one million "button up" fry for nursery stream release to 150,000 to 350,000, two-year-old, six-inch fish for release in large lakes. To maintain a broad range of flexibility for fishery management staff, the broodstock population has been held to meet the high-end requirement. Excess fry are released, to comply with regional preference, when annual population analysis and stocking requirements have been completed.

During the 1997 spawning season, 2,031,772 eggs were collected (Appendix 2). Average fecundity of 2,845 females was 713 eggs/female. A saline diluent was utilized during fertilization, and buffered iodophor disinfection solutions were used to water-harden eggs. A 72% eye-up occurred, resulting in 1,462,875 eyed eggs.

## **FISH FEED**

Production feed was purchased from Rangen, Inc. (Buhl, Idaho) in compliance with Idaho State contracting procedure. The feed projection program uses Haskell's formula with Delta L adjusted for expected monthly water temperature. Data on Spring Creek daily water temperature has been collected since 1980, and feed tests utilizing a variety of diets, feed delivery techniques, and rearing densities since 1989 have been utilized to institute the current program. Feed utilized and total cost during 1997 is found in Appendix 4.

## **PUBLIC RELATIONS**

Public relations efforts in 1997 were similar to those of previous years with a high level of interaction with the public. Hatchery personnel made an active effort to talk with as many of them as possible. As always, numerous tours were scheduled and provided to public and private school groups as well as families. A visitor information pamphlet provides a summary of information to complement the visitor information center and has been well accepted by the public.

For the first time, the CFFH was utilized as a site for a Free Fishing Day angler's clinic with 150 participants. Staff from the three local hatcheries, the local Conservation Officer, and volunteers took part in the all day event. We also opened the hatchery-settling pond for fishing. We had separated out several hundred four and five-year westslope cutthroat brood fish during the spawning season and stocked those to the settling pond a samples of native Idaho fish. While fishing was reported as being slow at other sites due to colder weather, we sent home literally hundreds trout with the happy participants.

The hatchery staff attended public hearings and sportsmen's club meetings in an effort to get the Department's programs and policies out. The mountain lake stocking program was completed with cooperation from the Boundary County Backpackers, the Rocky Mountain Academy, and Department reservists.

## **FISH HEALTH/CONDITION PROFILE**

Routine random necropsies have been performed at the CFFH since the spring of 1996. Health Condition Profiles (HCP) establish general health and quality indices to assess a given population of fish. Ronald Goede, Chief Pathologist Utah Division of Wildlife Resources has established HCP assessment procedures and his protocol has been adopted and followed at the CFFH.

A total of 26 necropsies have been performed to date at the CFFH. Using AUSUM, a computer program, a database with summary statistics has been established. From this data we can compare culture methods. During 1997, demand feeding versus hand feeding fish was evaluated utilizing this technique in addition to the standard growth/survival tests. The standard feeding protocol for trout at the CFFH had produced acceptable trout within the standards of the Department. When the production rainbow trout were split into two separate feeding programs (demand versus hand fed) and evaluated, two survival related results occurred. Demand fed trout had much higher blood protein levels as well as much higher mesenteric fat storage. This correlates very well with the higher growth rate in demand fed fish. The HCP has also been utilized to evaluate relative condition of domestic Kamloops reared at the Clark Fork hatchery versus domestic Kamloops transferred in from hatcheries in southern Idaho.

## **ACKNOWLEDGMENTS**

The CFFH would like to thank the Boundary County Backpackers Club, Rocky Mountain Academy, as well as Panhandle and Clearwater regional personnel for packing fish to mountain lakes. Thanks also to the hatchery staff Bio-aides Sarah Aavedal and John Suhfras.

Appendix 1. Fish production at the Clark Fork Hatchery, January 1, 1997 to December 31, 1997

Species/Strain	Source	Beginning number	Beginning pounds	Ending number	Ending pounds	Number stocked	Pounds stocked	Destination
Destination								
brook trout, BY96	Henry's Lake	7299	264	0	0	8111	388	lowland lakes
brook trout, BY97	Henry's Lake	0	0	0	0	14707	304	lowland lakes
brown trout, BY96	Nampa	0	0	0	0	4484	92	Hoodoo Creek
westslope cutthroat, BY92	Clark Fork	1053	1,170.00	0	0	0	0	broodstock
westslope cutthroat, BY93	Clark Fork	6405	3,685.00	5719	6650	0	0	broodstock
westslope cutthroat, BY94	Clark Fork	8843	3,685.00	7289	4556	0	0	broodstock
westslope cutthroat, BY95	Clark Fork	106377	7,598.00	10230	4092	106734	14695	Lake Pend Oreille
westslope cutthroat, BY96	Clark Fork	512628	2,240.00	133929	8641	254707	11475	Hayden Lake and lowland Lakes
westslope cutthroat, BY97	Clark Fork	0	0	593296	2184	559318	1025	mountain lakes, lowland lakes
Arctic grayling, BY95	Wyoming	576	28	447	67	0	0	
Arctic grayling, BY97	Wyoming	0	0	0	0	980	2	Mountain lakes
Kamloops rainbow, BY95	Hayspur	149466	14,815.00	0	0	108216	36046	Put and Take
Kamloops rainbow, BY96	Hayspur	0	0	75590	4784	302268	6876	Hayden Lake
Kamloops rainbow, BY97	Hayspur	0	0	173659	70	0	0	Hayden Lake
Kamloops rainbow, BY96	Trout Lodge	77190	150	59670	13561	2502	275	Put and take
Kamloops rainbow, BY97	Trout Lodge	0	0	20481	196	7027	16	Mountain lakes
Colorado R rainbow, BY95	Nampa	8837	1,091.00	0	0	6427	1634	Put and take
Colorado R rainbow, BY96	Nampa	0	0	11430	728	0	0	Put and Take
Hayspur rainbow, BY95	American Falls	41752	16,538.00	0	0	35163	13189	Put and take
Hayspur rainbow, BY96	American Falls	0	0	41615	19817	0	0	Put and Take
Hayspur rainbow, BY96	Hayspur	0	0	13477	1271	54422	1400	Put and Take

Appendix 2. Spawning summary, Clark For, westslope cutthroat, January 1, 1997 to December 31, 1997

Stock	Females Spawmed	Number of eggs Collected	Average Fecundity	Percent eye-up	Eyed eggs
Clark Fork	2,849	2,031,772	713	72	1,462,875

Appendix 3. Cost of fish produced at the Clark Fork Hatchery, January 1, 1997 to December 31, 1997

Species	Numbers Produced	Pounds Produced	Pounds Cost to Produce	Pondside Cost/1,000	Pondside Cost/lb	Streamside Delivery Cost	Streamside Cost/1,000	Streamside Cost/lb
Henry's Lake brook trout,3-5 inches	22,818	428	\$10,000	\$438.25	\$23.36	\$600	\$464.55	\$24.77
westslope cutthroat,BY93,BY94,BY95 >6 in.	129,972	13,783	\$10,000	\$76.94	\$0.73	\$300	\$79.25	\$0.75
westslope cutthroat, BY96, 2-5 inches	388,636	17,876	\$40,000	\$102.92	\$2.24	\$2,700	\$109.87	\$2.39
westslope cutthroat, BY97, <2 inches	1,152,614	3,209	\$10,000	\$8.68	\$3.12	\$2,000	\$10.41	\$3.74
Grayling,<2 inches	980	2	\$2,000	\$2,040.80	\$1,000.00	\$200	\$2,244.90	\$1,100
Grayling,>2 inches	447	39	\$2,000	\$4,474.27	\$51.28	\$0	\$4,474.27	\$51.28
Hayspur Kamloops, BY95	138,906	31,081	\$30,000	\$215.97	\$0.97	\$13,000	\$309.56	\$1.38
Hayspur Kamloops, By96	377,858	11,660	\$25,000	\$66.16	\$2.14	\$2,000	\$71.46	\$2.32
Trout Lodge Kamloops, BY96	62,172	13,686	\$20,000	\$321.69	\$1.46	\$0	\$321.69	\$1.46
Trout Lodge Kamloops, BY97	27,500	212	\$5,000	\$181.82	\$23.58	\$200	\$189.09	\$2.53
Colorado R rainbow, BY95	6,427	543	\$7,000	\$1,089.16	\$12.89	\$3,000	\$1,555.94	\$18.42
Colorado R rainbow, BY96	11,430	228	\$6,000	\$524.93	\$26.32	\$0	\$524.93	\$26.32
Hayspur rainbow , BY96	109,514	8,538	\$25,000	\$228.28	\$2.93	\$0	\$228.28	\$2.93
<b>Total</b>	<b>2387659</b>	<b>101285</b>	<b>\$192,000</b>	<b>\$80.41</b>	<b>\$1.90</b>	<b>\$24,000</b>	<b>\$90.47</b>	<b>\$2.13</b>

Appendix 4. Fish feed used in 1997 at the Clark Fork Hatchery

<b>Size</b>	<b>Source</b>	<b>Pounds</b>	<b>Cost/lb</b>	<b>Total cost</b>
BioDiet 1.3 mm	Bioproducts	33.8	\$ 0.78	\$ 26.36
BioDiet 3.0mm	Bioproducts	22.7	\$ 0.69	\$ 15.66
Rangen starter #0	Rangen	2,414	\$ 0.64	\$ 1,545.34
Rangen starter #1	Rangen	3,299	\$ 0.64	\$ 2,111.37
Rangen starter #2	Rangen	7,734.90	\$ 0.64	\$ 4,950.35
Rangen crumbles #3	Rangen	13,591.00	\$ 0.64	\$ 8,703.71
Rangen crumbles #4	Rangen	26,538.10	\$ 0.43	\$ 11,378.81
Rangen grower 3/32	Rangen	15,920.60	\$ 0.42	\$ 6,686.65
Rangen grower 1/8	Rangen	65,951.00	\$ 0.39	\$ 25,657.88
Rangen brood 5/32	Rangen	10,881.50	\$ 0.43	\$ 4,624.64
Rangen brood 3/16	Rangen	1,429.30	\$ 0.43	\$ 607.45
<b>Totals</b>		<b>147,817</b>		<b>\$ 66,308.23</b>

**IDAHO DEPARTMENT OF FISH AND GAME**

**ANNUAL REPORT  
CLEARWATER FISH HATCHERY  
1997**

**Brad George  
Assistant Fish Hatchery Manager**

**John Rankin  
Fish Culturist**

## INTRODUCTION

The Clearwater Fish Hatchery (CFH) is located in the small community of Ahsahka in Clearwater County, Idaho. Ahsahka is a native-American word meaning "where two rivers join," referring to the confluence of the North Fork of the Clearwater River to the main Clearwater River. The hatchery was built by the Army Corps of Engineers under the United States Fish and Wildlife Service (USFWS) Lower Snake River Compensation Plan (LSRCP) and was completed in 1991. Funding is provided by the USFWS, who also owns the facility. The hatchery is operated by the Idaho Department of Fish and Game (Department).

The primary purpose for Clearwater Hatchery is mitigation for anadromous fish losses due to hydroelectric dams. Anadromous fish production has yet to reach full capacity; therefore, the facility can use excess rearing containers for rainbow trout *Oncorhynchus mykiss* production.

The (Department) funded the resident trout program with \$38,818.98. Fish feed purchased by other budgets included; Cabinet Gorge (\$1,247.00), Hagerman (\$6,660.60), and Nampa (\$2,040). Permanent staff salaries (estimated at \$30,000) were funded by the LSRCP project.

The CFH water source is a double pipeline from Dworshak Dam, which can supply over 70 cubic feet per second (cfs) of reservoir water to the facility. Two intakes are at the dam. The primary intake is adjustable (5 to 50 feet) to collect surface water, and the secondary intake is fixed about 200 feet below full pool level. This design allows mixing of water of different temperatures.

## FISH PRODUCTION

### Release Year 1997

The CFH produced 295,521 catchables (133% of goal) that were released in 1997. Survival from January 1, 1997 to release was 98.9%. Catchables were produced from 393,041 eyed rainbow trout eggs received from Hayspur Hatchery in November and December 1995. Survival from eyed egg to release was 75.2%.

Due to a planned pipeline shutdown of the primary pipeline, Clearwater Hatchery traded fish with Nampa and Hagerman hatcheries to avoid water flow problems. Nampa hatchery shipped 50,715 catchables and sub-catchables for final rearing and to meet our September - October allocation. Survival from receiving to stocking was 81.8%.

Catchables stocked from Clearwater hatchery averaged 2.88 fish per pound (9.8 inches) and converted at a 1.49 rate.

### Release Year 1998

A total of 244,176 rainbow trout weighing 37,933 pounds (7.2 inches), and 13,383 west slope cutthroat weighing 452 pounds (4.4 inches), are on hand for catchable allocations during 1998 (Appendix 1).

## **Hayspur Stock**

We received 101,147 eyed eggs from Hayspur Hatchery on January 7, 1997. Survival to hatching was 87.0%, survival to ponding was 78.3% and survival to January 1, 1998 (sub-catchables) was 73.4%. Feed conversion for this group was estimated at 1.50.

A total of 135,520 fingerlings at 120 fish per pound were received from Nampa Hatchery in June, 1997. Survival to January 1, 1998 (sub-catchables) was 98.9%.

## **Ennis Stock (Erwin strain)**

We received 70,903 eyed eggs from Ennis National Fish Hatchery on July 2, 1997. Survival to hatching was 59.1%, survival to ponding was 55.6% and survival to January 1, 1998 (sub-catchables) was 50.7%. Feed conversion for this group was estimated at 1.27.

## **Washoe Park (west slope cutthroat)**

We received 33,460 eyed eggs from Washoe Park, Montana on June 10, 1997. Survival to hatching was 51.2%, survival to ponding was 49.6% and survival to January 1, 1998 (fingerling) was 40.0%. Feed conversion for this group was estimated at 2.23.

## **FISH FEED**

A total of 72,218 pounds of feed was purchased in 1997 for rainbow trout production (Appendix 2). Feed was purchased for an average of \$0.35 per pound from Rangen, Inc. (Buhl, Idaho) and Bioproducts (Warrenton, Oregon). Conversion for the year was estimated at 1.49.

## **FISH STOCKED AND TRANSFERRED**

The Clearwater Hatchery personnel stocked a total of 337,025 catchable rainbow trout in streams and lakes of the Clearwater and Southwest Regions during 1997. These fish averaged 2.88 fish per pound (fpp), weighed 116,824 pounds, and averaged 9.8 inches in length.

Due to a planned pipeline shut down of the primary pipeline in May, it became necessary to reduce holding of catchables due to insufficient water flows. Both Dworshak Reservoir and Cascade Reservoir were stocked by Clearwater for Nampa and Hagerman Hatcheries to complete this task. Flexibility in release dates, fish size, and numbers of fish released was imperative for successful stocking of 32 sites in 127 trips (Appendix 3).

## **PUBLIC RELATIONS**

The Clearwater Hatchery and satellites had several thousand "walk-in" visitors during the year. Some displays were acquired for the visitor center at the main hatchery.

The CFH personnel set up a booth at the Kiwanis Kids Spring Fair at Orofino Elementary School. A presentation was also given to the Kamiah High School Biology class. Special tours were given to patients from State Hospital North.

### **SPECIAL PROJECTS**

A total of 283 adult size fish, 2 to 10 pounds, were recovered from the settling pond. The Clearwater Hatchery crew supplemented 10 release sites in 23 trips with these large fish.

The CFH crew worked on the creation of a new put-and-take fishing pond using part of the old rearing pond at Red River Satellite. The pond was named "Karolyns" pond (in memory of Jerry McGeHee's mother) and was completed through a cooperative effort with the Region, Forest Service (Red River district, [construction of roadbed on parking lot and dyke]), CH2M Hill (artist concept drawings), Hahn Supply (loan of a tractor), Grassland West (grass seed), Valeria Yost (artwork on entrance sign), Lower Snake Compensation Program (wages and backhoe), Idaho County Road Dept. (transport of gravel), Mark Vafiades (core drilling), Pepsi Company (entry sign), and Potlatch Corp. (supply of pipeline).

The CFH supplied catchables for National Fishing week in June at Dworshak and Kooskia National Fish Hatcheries, and hatchery personnel assisted in the event. The hatchery planted Campbell's Pond in July for a fishing derby put on by the city of Pierce. Ten fish were floy-tagged for the event, and nine of those were turned in for prizes.

The CFH personnel assisted Eagle Fish Health Labs with Whirling Disease sampling in the upper South Fork of the Clearwater

Appendix 1. Clearwater Hatchery resident fish production, January 1 through December 31, 1997.

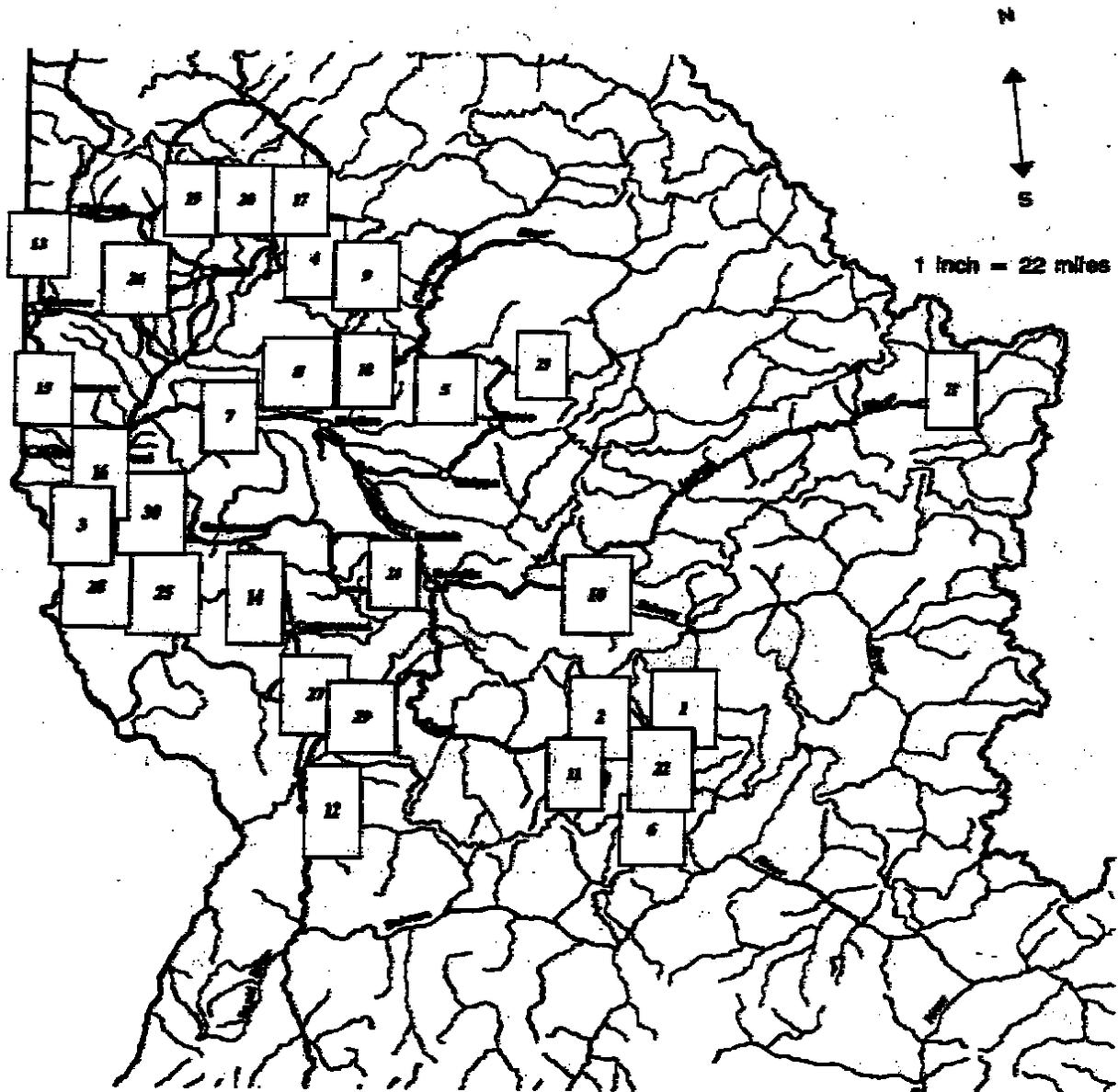
	Number	Weight	Feed Fed	Conversion	Cost/pound	Cost/ 1000 fish
Sac-fry on hand: 1/1/97	0	0				
Fish on hand:1/1/97	305,393	60,864				
Catchable						
Fish Received	50,715	10,750				
Eggs Received						
98 catchables	205,510	0				
99 catchables	375,000	0				
Fingerling Fish (K1) received	135,520	1,329				
Catchables Fish Liberated	337,025	116,824				
Fish on hand: 12/31/97	257,559	38,385				
<b>Production</b>	<b>594,584</b>	<b>86,102</b>	<b>72,218</b>	<b>1.49</b>	<b>\$0.45</b>	<b>\$65.29</b>

\*Estimated costs do not include permanent salaries.

Appendix 2. Fish feed usage and costs for the Clearwater Hatchery rainbow trout program, January 1 through December 31, 1997

Source	Formulation	Feed size	Pounds	Cost/pound	Total cost
Bioproduct	Biodiet grower TM-100	1.0mm	88	1.76	\$155.00
Bioproduct	Biodiet Grower TM-100	1.5mm	264	1.76	\$464.64
Bioproduct	Biodiet Grower	1.3mm	132	0.78	\$103.20
Bioproduct	Biodiet Grower	1.5mm	264	0.72	\$190.80
Rangen	Trout Grower	#4cc	1,500	0.33	\$495.00
Rangen	Trout Production	16-Jan	1,600	0.47	\$752.00
Rangen	Trout Production	Mar-32	21,670	0.33	\$7,151.10
Rangen	Trout Production	8-Jan	46,700	0.34	\$15,666.90
<b>Totals</b>			<b>72,218</b>	<b>0.35</b>	<b>\$24,978.64</b>

**Appendix 3. Locality map of 30 put-and take rainbow trout stocking sites, Clearwater Fish Hatchery 1996.**



- |                      |                        |                          |
|----------------------|------------------------|--------------------------|
| 1. American River    | 11. Five Mile Pond     | 21. Powell Pond          |
| 2. Big Elk Creek     | 12. Henry's Guich Pond | 22. Red River            |
| 3. Blue Lake         | 13. Hordemann Pond     | 23. Rhodes Creek         |
| 4. Camp Grizzly Pond | 14. Lawyers Creek      | 24. Robinson Pond        |
| 5. Campbells Pond    | 15. Levee Pond         | 25. Soldiers Meadow Res. |
| 6. Crooked Creek     | 16. Manns Lake         | 26. Spring Valley Res.   |
| 7. Dobbys Pond       | 17. Moose Creek Res.   | 27. Tolo Lake            |
| 8. Dworshak Res.     | 18. Orofino Creek      | 28. Waha Lake            |
| 9. Elk Creek Res.    | 19. Palouse River      | 29. Wilkins Pond         |
| 10. Fern Pond        | 20. Potlatch Creek     | 30. Winchester Res.      |

**IDAHO DEPARTMENT OF FISH AND GAME**

**ANNUAL REPORT  
GRACE FISH HATCHERY  
1997**

**Robert Hill  
Fish Hatchery Manager  
Paul Martin  
Fish Culturist**

## INTRODUCTION

Grace Fish Hatchery is owned and operated by the Idaho Department of Fish and Game (IDFG) and is funded by license sales. The hatchery was constructed in 1946 and is located seven miles south of Grace, Idaho.

The objective of the hatchery is to produce catchable and fingerling rainbow trout *Oncorhynchus mykiss* for stocking primarily in Southeast Regional waters. The hatchery also produces several specialty species of trout of various sizes to meet statewide requests.

Middle and West Whiskey Creek springs supply water to the hatchery. Flow was up somewhat from the prior drought years with an annual average of 15.8 cfs. This is up 1.1 cfs from 1996 and up 2.7 from 1995. There is a natural fluctuation in water quantity basically opposite of that from run-off, and hatchery biomass. Flows are at a minimum during May and June and peak in October and November. Hatchery biomass is at a maximum in May and at minimum in October. Water temperature is a constant 52°F.

Fish rearing space consists of sixteen (3 ft x 1.5 ft x 13 ft) single pass hatchery building vats, sixteen (4 ft x 3.5 ft x 40 ft) single pass small raceways, four (4 ft x 3.5 ft x 100 ft) single pass medium raceways, and six (14 ft x 2 ft x 300 ft) large raceways. The water for the large raceways is second use water from the vats and small and medium raceways that is mixed with fresh water from the middle spring. All hatchery water flows through a settling pond before being discharged into Whiskey Creek.

The hatchery is staffed with a Fish Hatchery Manager I, an Assistant Fish Hatchery Manager, and a Fish Culturist. Up to two temporary employees may be hired to assist with the various projects.

The operation of a fish trap on the Blackfoot River is also the hatchery's responsibility. The trap is located just upstream of the Highway 34 bridge, which is about one mile upstream of Blackfoot Reservoir. Operation of the trap occurs from early April through early June.

## FISH PRODUCTION

Grace Hatchery began the 1997 calendar year with 571,275 fish weighing 53,281 pounds. During 1997, 851,250 eggs of various species were received. A total of 185,855 fish, at a weight of 124,187 pounds, were planted and 12,000 fish at a weight of 4,615 were transferred during the year. Additionally, 88,625 eyed Blackfoot River yellowstone cutthroat trout eggs were planted into tributaries. At the end of the year there were 531,450 fish at a weight of 53,258 pounds. This accounts for a total production of 655,405 fish and 128,779 pounds (Appendix 1).

All of the fish produced at Grace were received as eyed eggs from various state and federal hatcheries (Appendix 2).

Rainbow trout, fingerlings and catchables combined, accounted for 84% of the total pounds produced but only 61% of total cost, or \$1.19 per pound. The specialty species combine for the remaining 16% of the pounds produced and 39% of total cost, or \$3.87 per pound

(Appendix 3). This increased cost is due to the higher cost of soft-moist fish food the specialty species require.

Production cost, excluding capital outlay, was \$196,696. Grace Hatchery also spent \$6,270 of Ashton Hatchery's budget and \$5,101 from Ririe Reservoir's budget. The grand total expenditures for 1997 were \$210,605.

Fish food cost for each lot, or group, of fish was used to generate total production cost for that lot. For example, rainbow catchables were fed \$28,753.27, or 47.7% of the total fish food expenditures of \$60,267.26. Administrative costs were total budget minus capital outlay minus fish food cost ( $\$210,605 - \$0 - \$60,267 = \$150,338$ ). Rainbow catchable administrative cost was  $(0.477 \times \$150,338) = \$71,711$ . Therefore, total rainbow catchable production cost was  $(\$28,753 + \$71,711) = \$100,464$  (Appendix 3).

Production cost was also calculated for pond side and stream side amounts. Pond side cost is total budget minus capital outlay minus transportation, stream side includes transportation costs (Appendix 4). These are bottom line figures and not broken out by species.

There were 610,600 fish requested and 683,230 planted or, 112%. See appendix 5 for a breakdown by species.

### **Catchable Rainbow Trout**

Grace Hatchery produced 227,480 10-inch catchable rainbow at a weight of 84,865 pounds. During the year, 185,855 (83,585 lbs) were planted, 12,000 (4,615 lbs) were transferred to Sawtooth Hatchery and 275,750 (45,734 lbs) remain on the station for future planting. Three different strains of rainbow were planted: Hayspur (R9), Mt. Lassen (R4), and Kamloop (K1). These fish converted 86,092 pounds of fish food at a rate of 1.02 to produce 86,092 pounds of flesh. The total cost of production was \$100,464.

### **Rainbow Trout Fingerlings**

During 1997, 254,070 (22,845 lbs) rainbow trout fingerlings were planted. All were Hayspur strain (R9). Spring fingerlings accounted for 89,965 (6,265 lbs) and fall fingerlings accounted for 164,105 (16,580 lbs). Because of the high water year and very good water conditions, half of the fall fingerlings for Chesterfield and Blackfoot Reservoirs were planted in the spring.

Both of these lots were treated with OTC feed to combat Coldwater Disease. The first treatment was unsuccessful. A second follow up treatment was administered and was successful.

### **Brown Trout**

The brown trout *Salmo trutta* (BN) reared at Grace Hatchery are the Plymouth Rock strain and were received in December 1996 as eyed eggs from Saratoga National Hatchery in Wyoming. The 128,500 eggs received produced 103,460 (930 lbs) 3 inch fingerlings. The Portneuf River, below Lava Hot Springs and Marsh Creek were planted with 23,180 fish each. The remainder were planted into the Bear River from Utah to Wyoming.

Another 125,000 Plymouth Rock brown trout eyed eggs were received December 1997 from Saratoga National Hatchery to fill 1998 requests.

### **Bear River Cutthroat**

The 65,000 eyed Bear River cutthroat trout *O. clarki ssp. (C7)* eggs were received from Daniels Hatchery in Wyoming. The 46,715 fish produced were planted as fry into Cottonwood, Eight Mile, and Bailey Creeks, all are Bear River tributaries.

### **Bear Lake Cutthroat**

Two brood years of Bear Lake cutthroat *O. clarki spp* were reared at Grace this year. Brood year (BY) 1996 were received as eggs in 1996, over wintered and 13,230 were planted in Montpelier and Little Valley Reservoirs. BY 97 was received as eggs in 1997, 1,000 fry were planted in Bloomington Lake, the remainder will be planted in 1998. These eggs are received from Utah's Mantua Hatchery.

### **Rainbow x Cutthroat Hybrids**

Four lots of rainbow x cutthroat eggs were received from Henry's Lake Hatchery. Three of the lots were heat shocked at temperatures of 25, 26, and 27 degree centigrade attempting to produce sterile triploid fish. The fourth lot was a control group. There was no survival or growth rate differences between lots. The 27 degree group had high enough percent triploids to pursue further testing, 4,000 of each the controls and 27 degree groups were clipped. The controls were right ventricular (RV) clipped and the 27 degree group was left ventricular (LV) clipped. Harriman Pond was planted with 2,000 of each, controls and 27 degree fish. Hawkins Reservoir was planted with 2,000 27 degree fish, 2,000 clipped controls, and 2,000 unclipped controls. The remaining fish were planted in American Falls Reservoir. Contact Henry's Lake Hatchery for further information.

## Lake Trout

Both brood years of lake trout *Salvelinus namaycush* reared at the hatchery were received as eyed eggs from Saratoga National Fish Hatchery and are the Lewis Lake strain. Of the lot received in 1995, 17,150 were planted into Lucky Peak Reservoir and 1,000 adipose fin clipped fish were planted in Payette Lake.

All 20,800 brood year 96 fish were planted in Bear Lake in November, 1997. These were 100% adipose clipped.

Brood year 97 eggs were received 10/22/97 and will be planted in Bear Lake early November, 1998.

## Splake

Two brood years of splake *Salvelinus fontinalis* x *S. namaycush* were reared at Grace this year. Both lots were received as eyed eggs from Wyoming's Story Hatchery and are a cross between a Soda Lake brook trout male and a Lewis Lake-lake trout female. Splake appear to survive much better when planted at lengths greater than nine inches.

A total of 6,250 brood year 95 fish we replanted; 2,000 to Waha Lake, and 4,250 to Lost Valley Reservoir. Two thousand BY 96 splake will go to Waha Lake, the remainder will go to Island Park and Ririe Reservoirs

Another 15,000 splake eggs, from the same cross, were received December 1997 to fill 1999 requests.

## Other

Grace Hatchery personnel planted 19,530 (210 lbs) brook trout for Ashton Hatchery in seven waters in the Southeast Region.

The Blackfoot River trap was not installed this year because of the impending flood. Adult Yellowstone cutthroat were collected from the Blackfoot River, transported and held in a private raceway about a mile from the hatchery. Twenty-six females produced 88,624 eggs for a fecundity of 3,409. The eggs were eyed up at the hatchery, average eye-up was 93.8% for 83,125 eyed eggs. The eyed eggs were planted in three locations on Blackfoot River tributaries. Modified 40 quart coolers were used as stream side incubators.

This project was a combined effort between Hatchery personnel, Southeast Region Fisheries, and teachers and students from Shelly, Idaho. The students enumerated unhatched eggs and determined an overall hatch rate of 91.4%.

## HATCHERY IMPROVEMENT

There were not any capitol purchases or budget for FY97 or FY98.

Needed projects include:

- Cover or bury the spring pond.
- Install new main line from the spring pond to a head box with new lines going to the vats, small, and medium raceways.
- Replace the large raceway headrace with a pipeline and controlling inlet valves to the raceways.
- Replace large raceways or recap concrete walls.
- Install an auxiliary water supply pipe from the main supply line to the small raceway header to increase flow.
- Install a cleaning line on the medium raceways similar to that on the small raceways.
- Replace residence #1 and #3 domestic water lines.
- Paint the hatchery building and 2-stall garage.
- Install baffles or extend air cleaning to the medium raceways.
- Install culverts and grade the driveway.
- Install an underground irrigation system.
- Rewire residences #1 and #3.

## FISH FEED

Rangens was the only brand of dry diet fed this year. A total of 106,957 pounds, at a cost of \$36,752.54, was fed to the rainbow trout. Bioproducts was the only supplier of soft-moist food this year. A total of 24,671 pounds at a cost of \$23,514.72, was fed to the specialty species. The grand total of fish food fed was 131,628 pounds at a cost of \$60,267.26 (Appendix 6). This is a decrease of 11,861 pounds but an increase of \$8,644.

## **PUBLIC RELATIONS**

The hatchery staff gave several scheduled tours to local area schools and numerous informal tours to interested general public visiting the facility.

Hatchery staff assisted with the Free Fishing Day clinics at Kelly Park Pond in Soda Springs and Dingle Gravel Pit near Montpelier.

### **Other**

Robert Morris, Assistant Hatchery Manager, resigned effective 12/22/97 to take a position with an accounting firm in Twin Falls. This position will be left vacant for five months.

Appendix 1. Number and pounds of fish produced, stocked, food fed, and food cost at Grace Fish Hatchery, 1997.

Species/strain Lot #	Number (pounds) on hand 01/01/97	Number planted (pounds)	Number (pounds) on hand 12/31/97	Pounds produced (food fed)	Food Cost/ (Conversion)
Rainbow / Kamloop Catchables	<sup>1</sup> 234,125 (49,069)	197,855 (88,200)	275,750 (45,734)	<sup>1</sup> 84,865 (86,092)	\$28,753.27 (1.02)
Rainbow (R4 and R9) Fingerlings	99,500 (137)	254,070 (22,845)	0	22,708 (20,828)	\$7,986.48 (0.92)
Splake 95-WY-SP	6,650 (1,110)	6,250 (2,975)	0	1,865 (2,399)	\$2,232.51 (1.29)
Splake 96-WY-SP	35,000 (Eggs)	0	31,000 (6,596)	6,596 (6,661)	\$6,283.39 (1.01)
Splake 97-WY-SP	0	0	15,000 (Eggs)	0	0
Lake Trout 95-SAR-LT	16,600 (2,440)	18,150 (5,375)	0	2,935 (4,243)	\$3,948.06 (1.45)
Lake Trout 96-SAR-LT	35,000 (Eggs)	20,800 (3,125)	0	3,125 (3,705)	\$3,521.38 (1.19)
Lake Trout 97-SAR-LT	0	0	55,000 (Eggs)	0	0
Cutthroat / Bear L. 96-WY-C5	15,900 (525)	16,430 (4,695)	0	4,170 (4,684)	\$4,360.12 (1.12)
Cutthroat / Bear L. 97-UT-C5	0	1,000 (3)	29,700 (928)	931 (1074)	\$1,115.69 (1.15)
Cutthroat / Bear R. 97-WY-C7	0	46,715 (44)	0	44 (74)	\$89.21 (1.68)
Brown Trout 96-WY-BN	128,500 (Eggs)	103,460 (930)	0	930 (1,093)	\$1,168.68 (1.18)
Brown Trout 97-SAR-BN	0	0	125,000 (Eggs)	0	0
Rbt X Cutt Hybrids / Henry=s L. 97-HL-RC	0	30,500 (610)	0	610 (775)	\$808.47 (1.27)
<b>Totals</b>	<b>571,275 (53,281)</b>	<b>695,230 (128,802)</b>	<b>531,450 (53,258)</b>	<b>128,779 (131,628)</b>	<b>\$60,267.26 (1.02)</b>

<sup>1</sup>Includes 12,000 fish at 4,615 pounds transferred to Sawtooth Hatchery

Appendix 2. Eyed eggs received at Grace Fish Hatchery, 1997.

Species/Strain	Source	Number Received	Date Received
Hayspur rainbow trout (R9)	IDFG Hayspur	40,000	01/13/97
Hayspur rainbow trout (R9)	IDFG Hayspur	182,000	01/22/97
Hayspur rainbow trout (R9)	IDFG Hayspur	123,000	01/27/97
Hayspur rainbow trout (R9)	IDFG Hayspur	60,000	02/03/97
Henrys Lake rainbow x cutthroat hybrids (RC)	IDFG Henrys Lake	63,250	04/24/97
Bear Lake cutthroat trout (C5)	Mantua, UT	30,000	06/02/97
Bear River cutthroat trout (C7)	Daniels, WY	65,000	06/19/97
Lake Trout / Lewis Lake (LT)	Saratoga NFH	55,000	10/22/97
Hayspur rainbow trout (R9)	IDFG Hayspur	93,000	11/17/97
Brown trout (BN)	Saratoga NFH	125,000	11/25/97
Splake (SP) Lewis L. (LT) X Soda L. (BK)	Story, WY	15,000	12/05/97
<b>Total</b>		<b>851,250</b>	

Appendix 3. Fish production costs, 1997.

Species	Size inches	Number produced	Pounds produced	Production cost	Cost/1,000	Cost/lb
Rainbow / Kamloop Catchables	10	239,480	84,865	\$100,464	\$420	\$1.18
Rainbow Fingerling	6	154,570	22,708	\$27,981	\$181	\$1.23
Splake	11	10,600	8,461	\$29,714	\$2,803	\$3.51
Lake Trout	9	42,350	6,060	\$26,112	\$617	\$4.31
Cutthroat, Bear L.	8	31,230	5,101	\$19,157	\$613	\$3.76
Cutthroat, Bear R.	2	46,715	44	\$390	\$8	\$8.86
Brown Trout	3	99,960	930	\$4,025	\$40	\$4.33
Rainbow X Cutthroat Hybrids	3	30,500	610	\$2,762	\$91	\$4.53
<b>Total</b>		<b>655,405</b>	<b>128,779</b>	<b>\$210,605</b>	<b>\$321</b>	<b>\$1.64</b>
Rainbow		394,050	107,573	\$128,446	\$326	\$1.19
Specialty Species		261,355	21,206	\$82,159	\$314	\$3.87

Appendix 4. Pond side and stream side production cost at Grace Hatchery, 1997.

<b>Pounds Produced</b>	<b>Pond side cost</b>	<b>Pond side cost/lb</b>	<b>Stream side cost</b>	<b>Stream side cost/lb</b>
128,779	\$198,505	\$1.54	\$210,605	\$1.64

Appendix 5. Fish requested and produced at Grace Hatchery, 1997.

<b>Species</b>	<b>Number requested</b>	<b>Number Planted</b>	<b>% Achieved</b>
Catchable rainbow trout	170,250	197,855	116%
Spring fingerling rainbow trout	7,500	89,965	1,200%
Fall fingerling rainbow trout	228,850	164,105	72%
Rainbow x cutthroat hybrids	0	30,500	
Fingerling brown trout	90,000	103,460	115%
Bear Lake cutthroat trout	0	17,430	
Bear River cutthroat trout	32,000	46,715	146%
Lake trout	65,000	38,950	60%
Splake	17,000	6,250	37%
<b>Totals</b>	<b>610,600</b>	<b>683,230</b>	<b>112%</b>

Appendix 6. Fish food fed and cost, Grace Hatchery, 1997.

Source	Diet	Size	Cost/lb	Pounds	Total cost
Rangens	Dry	Starter	\$0.579	105	\$60.80
Rangens	Dry	#1	\$0.579	395	\$228.71
Rangens	Dry	#2	\$0.579	1,300	\$752.70
Rangens	Dry	#3	\$0.579	3,200	\$1,852.80
Rangens	Dry	#4	\$0.309	14,956	\$4,621.40
Rangens	Dry	CC	\$0.309	6,750	\$2,085.75
Rangens	Extr 450 Bulk	1/8	\$0.32	74,351	\$23,792.32
Rangens	OTC Medicated	#4	\$0.5761	650	\$374.48
Rangens	OTC Medicated	CC	\$0.5683	5,250	\$2,983.58
<b>SUB-TOTAL</b>				<b>106,957</b>	<b>\$36,752.54</b>
Bioproducts	BioDiet	starter #1	\$1.0115	109	\$110.25
Bioproducts	BioDiet	starter #2	\$1.329	177	\$235.23
Bioproducts	BioDiet	starter#3	\$1.329	225	\$299.03
Bioproducts	BioDiet	1.0 mm	\$1.0886	660	\$718.48
Bioproducts	BioDiet	1.3 mm	\$1.0614	837	\$888.39
Bioproducts	BioDiet	1.5 mm	\$0.9979	2,380	\$2,375.00
Bioproducts	BioDiet	2.5 mm	\$0.948	1,499	\$1,421.10
Bioproducts	BioDiet	3.0 mm	\$0.9299	7,277	\$6,766.88
Bioproducts	BioDiet	4.0 mm	\$0.9299	11,507	\$10,700.36
<b>SUB-TOTAL</b>				<b>24,671</b>	<b>\$23,514.72</b>
<b>GRAND TOTAL</b>				<b>131,628</b>	<b>\$60,267.26</b>

**IDAHO DEPARTMENT OF FISH AND GAME**

**ANNUAL REPORT**

**HAGERMAN FISH HATCHERY**

**1997**

**Joe Chapman  
Fish Hatchery Manager II**

## INTRODUCTION

Hagerman Fish Hatchery (HFH) is a state-owned resident trout production facility. The HFH raises several strains of rainbow trout *Oncorhynchus mykiss* and various specialty species for statewide distribution. The HFH is the Idaho Department of Fish and Game's (Department) largest resident trout production facility. Built in 1947, it is located approximately 30 miles west of Twin Falls on the Snake River.

Funding is provided through Department license money. There was approximately \$420,000.00 from Hagerman's budget and approximately \$88,200.00 from the fish transportation budget used to rear and plant fish in the 1997 production year, not including capital outlay expenditures (Appendix 1).

The HFH is staffed with a Hatchery Manager II (Joe Chapman), a Hatchery Manager I (Walt Rast), and one Fish Culturist (Kevin Price). This past year, fish culturist Michele Baer resigned and due to budget constraints this position was not filled. Also, Ralph Taylor, one of two transport operators, retired and this position was not filled either. The remaining fish transport operator is Ken Taylor. About 15 months of temporary labor is available for use during the year.

The HFH water supply consists of approximately 52 cubic feet per second (cfs) from Tucker Springs during the winter and 47 cfs during the irrigation season. An additional 69 cfs is supplied from Riley Creek, although the quantity and quality fluctuates seasonally. The Tucker Springs water serves the 2,045 cubic feet of rearing space in the HFH building, 10,530 cubic feet of rearing space in the fingerling ponds, and up to 138,000 cubic feet of rearing space in the large production raceways. Riley Creek water supplies the 165,600 cubic feet of rearing space available in eight additional raceways. The Tucker Springs water is a constant 59°F year-round, and Riley Creek fluctuates from 50°F to 67°F annually.

## HATCHERY PRODUCTION

During 1997, HFH stocked 3,573,162 fish weighing 355,629.5 pounds. Of these, 681,870 were planted eight inches long and larger, and 2,891,292 were planted smaller than 8 inches long (Appendix 1). About 52% of the total fish planted were stocked in the Magic Valley Region waters (Appendix 2). The larger fish were rainbow trout from Haypur Fish Hatchery and Kamloops rainbow trout of various strains, while the two to eight-inch fish consisted of rainbow trout, Kamloops trout, steelhead, and Colorado River rainbow trout (Appendix 1).

The HFH reared and stocked 2,891,292 fingerlings of a 2,921,200 fingerling request or 98.98% of the requested fingerlings. About 681,870 catchables were reared and stocked of a requested 644,000 for 106.9 % efficiency. The combined fingerling and catchable stocking to request average was 100.2%.

The 355,629.5 pounds planted included 232,763.5 pounds of put-and-take fish averaging 9.3 inches and 122,866 pounds of fingerlings that averaged 4.4 inches. The cost of planting the average 10.1 fish per pound (6.15 inches) was approximately \$1.04 per pound, or \$103.68 per 1,000 fish (Appendix 1).

In addition to the fish reared and planted, an additional 1,604,000 fish weighing 107,497 pounds were on hand at the HFH on December 31, 1997. These were comprised of 1,243,000

fish weighing 106,593 pounds (average 11.7 /lb, or 5.7 inches) in the large raceways, and 361,000 fingerlings weighing 904 pounds (average 400 /lb, or 1.8 inches) in the west raceways. The cost of producing the larger fish was \$0.64 /lb or \$157.69 /1,000, and \$1.34 /lb or \$84.30 /1,000 for the fingerlings (Appendix 1).

On hand January 1, 1997 were 2,291,738 fish weighing 71,964 pounds. Consequently, these subtractions yield a net production for 1997 of 2,885,424 fish weighing 391,162.5 pounds, mortality excluded (Appendix 1).

A total of 12,391,403 eggs and fry were acquired to yield the fish produced. A total of 2,826,360 eggs were purchased, and the balance was acquired from governmental sources at no cost (Appendix 4). Of the 12,391,403 eggs received, 6,882,621 were received for the fish planted, and the balance was used for 1998 production. No eggs were shipped to north Idaho hatcheries in 1997.

Survival rates improved in most groups this past year because of changes in fish culture practices and the improvements made in keeping birds out of the rearing area (Appendix 3). This corresponds to an improved feed conversion also (see Fish Feed section).

In addition to the requests from the regions, the HFH crew also hauled and stocked 250 white sturgeon from Hagerman National Fish Hatchery into the Snake River, 6,611 channel catfish from Oklahoma via Pocatello into Magic Valley Region waters, 1,200 pounds of fall chinook from Lyons Ferry Hatchery to Hells Canyon, and 90,705 rainbow trout from Clear Springs Fish Hatchery into area waters. The transportation team also stocked fish for Grace, American Falls, Ashton and Mackay hatcheries.

## **FISH FEED**

The fish produced during fish year 1997 were fed a total of 408,440 pounds of feed acquired from Rangens, Inc. (Appendix 5). The net weight gained during 1997 was 391,162.5 pounds, which resulted in an overall conversion of 1.04 pounds of feed to produce 1 pound of fish, not including the weight of the mortalities (Appendix 5).

## **HATCHERY IMPROVEMENTS**

Numerous HFH improvements were completed this year and are listed below:

- The roadway at the upper end of the HFH was enclosed with chicken wire and two new gates installed. This eliminated opening seventeen roadway gates.
- The air-cleaning lines were removed, cleaned and the holes reopened to allow air passage.
- The Riley Creek shed was moved to allow truck passage at the upper end of the raceways.
- A concrete wall was constructed in the HFH talirace to prevent water from the HFH getting into the Riley Creek impoundment.
- A show pond was built so visitors would have some large fish to look at.

- The self-guided visitor tour/display was completed.
- A sight tube was installed on the large Tucker springs pipeline.
- Water flow measurement units were installed on the two Tucker Springs pipelines.
- The concrete floor in the overhead storage area was extended and electricity installed to this building.
- A fishing access pier was completed over Riley Creek.
- A new feed blower motor was installed and a new air blower motor was installed for the west raceways.
- Some new trees and shrubs were planted around the HFH and a new sprinkler line was installed in the orchard.
- Two leaking compartments in the fish hauling transport trailer were repaired, and the rear axle of this trailer was fitted with an air-ride suspension system.
- The fish pump was removed from the truck, and it was mounted on and reinstalled on a more powerful truck to make it more efficient.
- A deck cover was installed on Res. #1, and a dishwasher was installed in Res. #3. Swamp coolers were installed in Residences 1, 2, and 3.
- New fish-grading racks were made for the dewatering tower.

## **PUBLIC RELATIONS**

The HFH receives a large number of visitors and sportsmen throughout the year. An estimated 22,000 visitors toured the facility and used the surrounding public grounds this year. The 37 acres of HFH property is surrounded by 880 acres of the Hagerman Wildlife Management Area (WMA). The WMA provides a large variety of outdoor experiences, including fishing and hunting, watchable wildlife viewing, and family picnic uses.

The HFH personnel were called upon to give numerous school tours during the spring and fall, and several talks were presented to regional personnel and civic groups.

HFH personnel also participated in a clinic at Oster #1 on free fishing day.

## FISH TAGGING OPERATIONS

The HFH crew participated in several tagging operations during the year. Adipose-clipped fish from a Colorado River rainbow trout stock were planted into the Snake River and Rock Creek. The purpose of this investigation was to determine if a river-strain rainbow trout would return to the fishery better than the standard HFH stocks. Regional fishery personnel will be evaluating these fish this year.

The investigation continued on Ririe Reservoir to compare return rates of HFH and Nampa Fish Hatchery catchable-sized fish. The purpose of this study was to determine if fish reared at Hagerman on Riley Creek water and possibly infected with the parasite *Sanquinicola* sp. would return as well as fish reared at Nampa. The 12,407 fish stocked from Hagerman were adipose-clipped, while Nampa Fish Hatchery's 12,270 fish were given a right ventral clip. Nampa's fish averaged about 0.8 inches larger throughout the stocking period of May, June and July. About 10,000 Mackay Fish Hatchery magnums were stocked also. A total of 61 Nampa-origin fish were observed in the creel, while 32 Hagerman-origin fish were observed. Only 0.5% of the Nampa fish and 0.26% of the Hagerman fish were observed in the creel, while Mackay magnums, although only 29% of the total trout stocked, provided almost 60% of the trout observed in the creel. This experiment will be conducted this year to again compare the different programs.

Island Park Reservoir received adipose-clipped fingerlings again this year as part of an ongoing study to determine emigration from the reservoir and contribution to the fishery below the reservoir (Appendix 6).

Mormon and Roseworth reservoirs also received fish that were clipped. The purpose of these investigations is to determine the cost of the fish that returned to the creel. Data collection is ongoing.

Finally, 300 jaw-tagged fish were stocked into Lucky Peak Reservoir to determine the exploitation rates of these fish. Data is still being evaluated.

To follow up on the 40 Passive Integrated Transponder (PIT)-tagged sturgeon that were released into upper Riley Creek to control the aquatic vegetation there, almost all of the sturgeon have migrated from their release site downstream into Riley Creek pond and the Anderson Lakes. One fish was even found below the settling pond in Riley Creek, indicating the possibility of getting into the Snake River. To date, four of the forty fish stocked have died. Anglers have reported seeing them in Riley pond, the settling pond and the Anderson lakes.

Also, in the fall of 1997, carp were identified in the Riley Creek pond. How they got there is unknown, but about fifty could be seen during the winter at the bridge on Riley Creek as Riley Creek water enters the pond. They all appeared to be exactly the same size. A migration barrier was placed on the diversion leading to Anderson #1 so these fish would not get into the intake pool and subsequently into the raceways. Eradication of these fish could take place during the winter in Riley Creek as they seek out the warmer water there.

## **ACKNOWLEDGMENTS**

Thanks to the permanent HFH staff of Walt Rast, Michele Baer, and Kevin Price; to the transport operators Ken Taylor and Ralph Taylor; and to the temporaries Wayne Wingert, Larry Miller, and Scott McCall.

The regional fisheries and enforcement personnel Fred Partridge, Jeff Dillon, Richard Holman, and Gary Hompland also deserve our gratitude. Also, thanks to Niagara Springs and Magic Valley Fish Hatchery personnel for their cooperation this year.

Appendix 1. Costs of fish produced at Hagerman Fish Hatchery, FY97. Costs reflect all costs budgeted except capital outlay plus \$88,200.00 of the fish transportation budget.

<u>Species/Strain</u>	<u>Length in inches</u>	<u>Number of fish produced</u>	<u>Weight, pounds</u>	<u>Cost to produce and plant</u>	<u>Cost/1,000</u>
<u>FISH ON HAND JANUARY 1, 1997</u>					
Hayspur rainbow trout	9.75	33,300	13,320		
Hayspur rainbow trout	7.8	44,123	9,388		
Hayspur rainbow trout	1.45	1,429,017	1,948		
Kamloops rainbow trout (Hayspur)	5.6	590,124	46,673		
Kamloops rainbow trout (Hayspur)	1.93	195,174	635		
<b>Totals</b>		<b>2,291,738</b>	<b>71,964</b>		
<u>FISH PLANTED</u>					
Hayspur rainbow trout	9.6	127,179	47,470	\$23,162.49	\$182.13
Kamloops rainbow trout, (TL)	9.3	554,691	185,294	\$97,866.23	\$176.43
<b>Subtotals</b>		<b>681,870</b>	<b>232,764</b>	<b>\$121,028.72</b>	<b>\$177.50</b>
Hayspur rainbow trout	4.48	2,060,963	83,340	\$175,164.86	\$84.99
Kamloops rainbow trout	4.85	705,311	36,250	\$64,896.48	\$92.01
steelhead, Sawtooth	3.43	63,750	750	\$4,148.34	\$65.07
Colorado River rainbow trout	4.51	61,268	2,526	\$5,242.15	\$85.56
<b>Subtotals</b>	<b>Average</b>	<b>4.43</b>	<b>2,891,292</b>	<b>122,866</b>	<b>\$249,451.83</b>
<b>Total Planted</b>	<b>Average</b>	<b>6.14</b>	<b>3,573,162</b>	<b>355,630</b>	<b>\$370,480.55</b>
<u>FISH ON HAND DECEMBER 31, 1997</u>					
Hayspur rainbow trout	8.31	34,000	8,393	\$5,361.29	\$157.69
Hayspur rainbow trout	1.77	361,000	904	\$12,122.14	\$33.58
Kamloops (TL) rainbow trout	5.6	1,186,000	95,111	\$117,321.26	\$98.92
Kamloops rainbow trout	6.68	23,000	3,089	\$2,914.76	\$126.73
<b>Totals</b>		<b>1,604,000</b>	<b>107,497</b>	<b>\$137,719.45</b>	<b>\$85.86</b>
<u>TOTAL FISH PRODUCES</u>					
Planted in 1997		3,573,162	355,630		
On Hand December 31, 1997		1,604,000	107,497		
<b>Totals</b>		<b>5,177,162</b>	<b>463,127</b>	<b>\$508,200.00</b>	
From other hatcheries		0	0		
On Hand January 1, 1997		(2,291,738.00)	(71,964.00)		
<b>Total gained</b>		<b>2,885,424</b>	<b>391,163</b>		

\*Catchables (8 inches and longer)

\*Fingerlings (less than 8 inches)

Appendix 2. Fish distribution from Hagerman Fish Hatchery, 1997.

	Number	Pounds	Percent of number planted by Region						
			1	2	3	4	5	6	7
<b>Catchables &lt;8 inches</b>									
Hayspur rainbow trout	127,179	47,470	-	-	6.3	65.1	28.6	-	-
Kamloops rainbow trout	554,691	185,294	-	-	12.6	36.1	43.2	8.1	-
Subtotal	681,870	232,763	0.0	0.0	11.4	41.5	40.5	6.6	0.0
<b>Fingerlings &gt;8 inches</b>									
Hayspur rainbow trout	2,060,963	83,340	-	-	15.8	51.4	15.3	17.5	-
Kamloops rainbow trout	705,311	367,250	-	-	19.9	54.7	25.4	0.0	-
steelhead	63,750	750	-	-	-	100.0	-	-	-
Colorado R. Rainbow trout	61,268	2,526	-	-	-	100.0	-	-	-
<b>Subtotal</b>	<b>2,891,292</b>	<b>122,866</b>	<b>0.0</b>	<b>0.0</b>	<b>16.1</b>	<b>54.3</b>	<b>17.2</b>	<b>12.4</b>	<b>0.0</b>
<b>Total</b>	<b>3,573,162</b>	<b>355,629</b>	<b>0.0</b>	<b>0.0</b>	<b>15.2</b>	<b>51.9</b>	<b>21.6</b>	<b>11.3</b>	<b>0.0</b>

Appendix 3. Fish survival from eyed egg to plant, 1997.

Species/Strain	Number planted	Eggs Received	Percent survival
Kamloops trout, Troutlodge	609,976	1,326,360	46
Kamloops trout, Hayspur	650,026	1,115,618	58
Hayspur rainbow trout	2,188,142	4,116,053	53
steelhead, Sawtooth Hatchery	63,750	118,000	54
Colorado River rainbow	61,268	179,780	34
<b>Total</b>	<b>3,573,162</b>	<b>6,855,811</b>	<b>52</b>

Appendix 4. Numbers of eyed eggs and fry received, species, and source for fish produced in 1996.

Species/Strain	Eggs received		Source
	For Fish Planted	For fish on hand December 31, 1997	
rainbow/Kamloops	1,326,360	1,500,000	Troutlodge, Washington
rainbow/Kamloops	1,115,618	839,928	IDFG Hayspur
rainbow/Hayspur	4,116,053	2,727,078	IDFG Hayspur
rainbow/Hayspur (RR)	179,780	-	IDFG Hayspur
steelhead	118,000	-	IDFG Sawtooth Hatchery
coho	-	441,776	Lewis River Hatchery
Washington Dept. of Fish and Wildlife			
Subtotal eggs	6,855,811	5,508,782	
Received as fry			
rainbow/Hayspur	26,810	-	IDFG Hayspur
<b>Total</b>	<b>6,882,621</b>	<b>5,508,782</b>	

Appendix 5. Fish feed used during Fish Year 1997 at Hagerman Fish Hatchery.

<b>Size</b>	<b>Source</b>	<b>Pounds</b>	<b>Cost/pound</b>	<b>Cost</b>
Str	Rangens	850	\$0.56	\$478.04
#1	Rangens	9,000	\$0.56	\$5,061.60
#2	Rangens	25,850	\$0.56	\$14,538.04
#2 TM	Rangens	230	\$0.57	\$131.08
#3	Rangens	40,150	\$0.56	\$22,580.36
#4	Rangen	79,650	\$0.30	\$24,086.16
1/8 in, EXT450Float	Rangens	164,410	\$0.31	\$50,967.10
1/8 in, Low P, Float	Rangens	86,550	\$0.34	\$29,427.00
1/8 in, TM	Rangens	1,750	\$0.50	\$869.75
<b>Total</b>		<b>408,440</b>	<b>\$0.36</b>	<b>\$148,139.13</b>

Appendix 6. Summary of fish marked in 1997 at Hagerman Fish Hatchery.

<b>Date planted</b>	<b>Species</b>	<b>Water</b>	<b>Number</b>	<b>Pounds</b>	<b>Clip</b>
26-Mar	K1	Roseworth Reservoir	15,000	5,000	Right maxillary
2-May	K1	Mormon Reservoir	5,060	1,235	Adipose
5-May	K1	Ririe Reservoir	4,200	1,150	Adipose
10-Jun	K1	Ririe Reservoir	4,100	1,560	Adipose
10-Jul	K1	Ririe Reservoir	4,107	1,850	Adipose
10-Jun	R9	Island Park Reservoir	72,720	2,309	Adipose
2-Oct	RR	Snake R.-Bell Rapids	5,000	900	Adipose
14-Oct	RR	Rock Crk-Sugar Fact.	1,656	92	Adipose
14-Oct	RR	Rock Crk-County Park	1,656	92	Adipose
14-Oct	RR	Rock Crk -City Park	1,656	92	Adipose
14-Oct	RR	Snake R.-Glenn's Ferry	15,200	400	Adipose
Oct. 15	RR	Snake R.-Bell Rapids	36,100	950	Adipose
<b>Totals</b>			<b>166,010</b>	<b>15,630</b>	

**IDAHO DEPARTMENT OF FISH AND GAME**

**ANNUAL REPORT  
HAYSPUR FISH HATCHERY  
1997**

**Bob Esselman  
Fish Hatchery Manager II**

**Doug Young  
Assistant Fish Hatchery Manager**

**Paul Dorman  
Fish Culturist**

## INTRODUCTION

Hayspur Fish Hatchery (HSFH) is a license-funded resident salmonid broodstock facility. The mission of the HSFH is production of eyed eggs. Three captive rainbow trout *Oncorhynchus mykiss* broodstocks are maintained on station. These are the Hayspur strain of rainbow trout, the Colorado River rainbow trout, and a Kamloops strain of rainbow trout. The HSFH personnel maintain an on-site free public campground, a general season pond fishery, and a trophy stream fishery.

The HSFH is located in Blaine County, approximately 40 miles south of Sun Valley on Loving Creek. The HSFH property is an odd shaped 105.12-acre parcel. Fish culture facilities include incubation building, housing, vertical incubator stacks, isolation incubators, moist egg chiller, and egg picking apparatus. The HSFH building has 20 early rearing tanks; 12 covered 24-ft circular ponds, 6 small raceways, and 6 large production raceways.

Water sources include the covered Hayspur spring that supplies 3.0 to 5.5 cubic feet per second (cfs) at 52°F (11.6°C), three pumped artesian wells producing 5.0 cfs at 48°F to 52°F (8.9°C to 11.6°C), and 7.4 to 18 cfs of Loving Creek water at 33°F to 73°F (0.6°C to 22.7°C). The spring and well water are both considered specific pathogen free (SPF) water supplies.

Three permanent employees (Fish Hatchery Manager II, Assistant Fish Hatchery Manager, and Fish Culturist) and 10 months of temporary biological aide time are assigned to the HSFH. Usually, three biological aides are hired for the spawning season.

## RAINBOW AND KAMLOOPS EYED EGG PRODUCTION

The 1997 spawning season was an eight-month project, with an egg take of 14,947,800 green eggs during the period covered. Spawning begins in September and ends in April. Eggs were taken from 4,282 females. A total of 8,927,554 eyed eggs were produced (Appendix 1). Photoperiod manipulation, or light control, has expanded "normal" spawn timing to more closely match egg production with eyed egg requests. Light control seemed to "work" this season. Only three-year-old rainbows and Kamloops were manipulated. We have found two-year-olds respond poorly to photoperiod manipulation. Hayspur rainbow trout eyed egg production totaled 6,058,623, Kamloops eyed egg production totaled 2,485,706, and Colorado eyed egg production totaled 383,225 (Appendix 1). Hagerman, Nampa, American Falls, Grace, Ashton, Clark Fork, Clearwater, Cabinet Gorge, and Sawtooth hatcheries were shipped eggs as per their requests. Cabinet Gorge Fish Hatchery was shipped eggs in excess of requests or to provide fry to Hagerman Fish Hatchery through delayed development. Magic Valley Fish Hatchery was shipped trout eggs destined for Hagerman to provide space in Hagerman Fish Hatchery's incubation system for a large lot of Coho. Value to the Department of these eyed egg shipments equates to \$133,815.52 at the current contract price of \$15.00/1,000 eggs (Appendix 2).

## RE-DISTRIBUTION OF CATCHABLES

Fish requested for the Big and Little Wood drainages were reared at Nampa Fish Hatchery, hauled to HSFH, and stocked by HSFH personnel. Semi-tank and trailer loads were hauled as needed to complete our requests. Raceway F, modified in 1996, supported up to 20,000 catchables on reuse water from the circular ponds without supplemental oxygen. Area waters were stocked with 58,664 Kamloops rainbow trout were stocked in area waters (Appendix 3).

## **FISH FEED**

Silver Cup, Inc. provided the 1/4-in brood feed. This food was ordered with 150 g/ton canthaxathin red additive to enhance egg color and other possible health benefits. Rangen Inc. was the source of early rearing feeds, the food for catchables and for replacement broodstock feeds (Appendix 4).

## **HATCHERY IMPROVEMENTS AND NEEDS**

Improvements to the HSFH during 1997 included:

- A new pressure tank on the domestic water system has provided consistent pressure to all connections.
- The old HSFH building was scraped and painted a snazzy two-tone paint job. Prisoners from Blaine County helped the HSFH personnel.
- An effluent line from small raceway 1 and 2 was replaced.
- Well #4 was enclosed with chain link and a sound barrier was added.
- \$28,761.56 was added to the operating budget to bring expenditures in line with budget.
- Bird wire was installed over the small raceways.

Needs of the HSFH, listed in order of priority, are:

- Provide security fencing around electrical control panels and pumps. Public safety and liability issues need to be addressed pertaining to the extreme electrical danger of 480-volt three-phase power.
- Repair the roof of the office/crew quarters/shop building.
- Replace the domestic water system.
- Install an alarm system to monitor water levels and pump function.
- Replace roof of residence #1.

## **BROODSTOCK MANAGEMENT**

The Hayspur rainbow trout replacement population was developed by using year-class crosses. This year, three-year-olds were crossed with five- and six-year olds. One-male and one-female pairings were performed with 200 pairs. These adult fish were either sacrificed for pathogen work up or adipose clipped. Marked fish will not be used again for development of a replacement population. Marked fish will be used for production eggs.

Hayspur's Kamloops replacement population was developed by using three-year-old adults of mixed Trout Lodge/Skanes stock and a mixed year class population of four- to seven-year-old adults of Trout Lodge stock. Fish used for the replacement population were sacrificed or marked to identify them. Marked fish are used for production egg lots, but not used again for development of a replacement population.

The Colorado River rainbow trout replacement population was developed by using 200 year-class crosses. Differential marks by year class are necessary. Currently, three-year classes (BY92, BY93, and BY94) are in one circular pond. These fish are progeny of adults trapped and spawned in the Colorado system. These fish demonstrate characteristics of swimming away from humans, feeding primarily in the middle of the water column, showing red during breeding readiness, and have well developed teeth. Most of the regional managers have requested a few and are evaluating the performance of these fish.

Pathogen status was addressed in a couple of ways. Oxytetracycline and penicillin G injections to most females was performed to reduce the chance of vertical transmission of Coldwater Disease (CWD). After reviewing historic Bacterial Kidney Disease (BKD) data and discussion with Department pathologists, a decision was made to cull progeny of females with ELISA values  $>0.11$ . Positive results from virology and other bacteriological techniques result in fish being culled. The goal is to effect the BKD status while maintaining genetic material. The trend is very encouraging in that numbers of culled families was low.

## **PUBLIC RELATIONS**

Tours were provided to area schools. Bellevue Elementary, Burley Elementary, Hailey Elementary, Hemingway School (Ketchum), Little Annie's Day Care, Minico High School, Paul Elementary, Shoshone Elementary, Wood River High School, and two home school groups were shown the life cycle of trout and had questions answered. Organized groups that were given tours included Flyfishers of Idaho, Good Sam RV Clubs, Carey Cub Scouts, Camp Rainbow Gold, College of Southern Idaho Aquaculture Program, and 4-H Clubs.

Naples, Wood River High School, Kellogg, Fairfield, Shelley Jr. High, Shelley High, Hobbs Middle School, Goodsell Elementary, Jerome Middle School, Murtaugh High School, Kimberly High School, East Minico, and Pioneer Elementary Schools were shipped eyed eggs. Some of the resultant fry were stocked into Adopt-a-Stream projects. Salmon region biologists used ripe adults for spawning demonstrations and anatomy lessons at Challis High School, Leadore and Brooklyn Elementary. Gebhards Creek, at the Morrison Knudsen Nature Center, was shipped eyed eggs for public viewing of the developmental stages of rainbow trout. Approximately 7,000 individuals visited, camped, and/or fished on HSFH property. Gaver Lagoon continues to gain popularity among a variety of anglers including the physically challenged and children.

The HSFH campground benefited from the efforts of volunteer Camp Hosts. Travis and Sherry Dilleha volunteered time to answer questions, give directions, clarify regulations, tidy outhouses, clean up litter, provide fishing tips, assist with stocking fish, and generally enhance the image of the Department.

## **SPECIAL PROJECTS**

### **Wetland Project**

As of August 2, 1997 the wetland project was one year old. This project was conducted in order to create some open water on the lower wetland areas of the HSFH property. A very wet spring and summer made for more water than expected in the new ponds and the surrounding area. Clean up of left over blasting debris and opening up of some blocked canals were the main focus of efforts in the spring and early summer.

An encouraging amount of vegetation has come back in just one year. The initial plan for the wetland project was to "wait and see" what the native vegetation would do after the blasting, then plan where the best areas for supplemental planting of nesting cover would go. Willows along the edges of the blasting zones were thriving despite absorbing a great deal of blast material.

Duck weed *Lemna minor* was planted in all the ponds, as well as Sago tubers *Potamogeton pectinatus*, Japanese millet *Echinochloa crus galli*; var., and Common sunflower *Helianthus annuus*. All of these were planted to provide food for wildlife and for bank stabilization. Unfortunately, most of the Sago tubers did not survive due to lowered water levels in the ponds associated with area irrigation demands.

A thistle and weed eradication program was undertaken in the wetland area and on the adjacent HSFH grounds this summer. The HSFH personnel treated the thistles with the herbicide Trimec™ and by uprooting the plants with shovels. Terry Gregory (regional wetland biologist) sprayed the herbicide Round Up™ on areas that will later be planted with taller and stiffer grasses to provide better nesting habitat.

Terry Gregory provided poles for the goose nesting boxes constructed by Kevin Price (Fish Culturist/Hagerman). The boxes have been put on the poles and will be set out this winter.

Mabel Jankowski-Jones, the department botanist, conducted a tour with HSFH personnel and individuals from Federal agencies in the summer of 1997. The tour group included: John Olson (EPA, Boise), Frank Fink (NRCS, Boise), Peggy Guillory (USFWS, Partners for Wildlife Division) and Barbara Benge (Army Corps of Engineers/Wetlands, Walla Walla). Members of the group had questions pertaining to cost, labor, time and permits. Members were surprised how well the area had revegetated in one year.

### **Triploid (3N) and Tetraploid (4N) Project**

On November 26th, 1996 we assisted Magic Valley Fish Hatchery Evaluation personnel Jeff Dillon and Chuck Alexander with continuing ploidy work. The project goal was to generate tetraploids and possibly triploids. New timing scenarios for the application of hydrostatic pressures and the introduction of heat shocks were used.

A total of 85,638 Hayspur rainbow trout green eggs were used. Four tetraploid and two triploid groups were treated using heat shock and hydrostatic pressure. The pressure treatments were 9000 pounds per square inch (psi) and 8500 psi. These pressures were found to have the best induction rates in the literature and prior experiments. Two tetraploid groups were exposed to a 30.5°C and 31.5°C heat shock (appendix 5).

Both triploid groups were exposed to a 26°C heat shock for 20 min. One group received treatment 12 min after fertilization and the second 14 min after fertilization.

Application of the hydrostatic pressure or heat shocks did not appear to affect egg development timing. All pressure and shock treatments entered the eyed stage at 17 days, 340 thermal units (TU), which is normal for Hayspur rainbow trout production eggs at 11.3°C (52°F). Hatching also occurred normally at approximately 30 days, 600 TU, at 11.3°C. Upon hatching, an increase in fish deformities was noted in all groups (appendix 5).

Fish growth was similar to normal Hayspur rainbow trout production fish. At three-inches total length, lethal blood sampling was performed. On June 6th and 26th, 60 fish per experimental group were sampled. Gary Thorgaard and Paul Wheeler performed Blood analysis at WSU. The results demonstrated tetraploidy was induced in one experimental group. A total of three fish from a 60 fish sample showed tetraploidy in the 8500 psi group. Triploid blood sampling occurred on July 7th. Results of analysis showed that triploidy was induced in both groups (appendix 5).

A total of 41,603 excess fry from this experiment were stocked into Magic Reservoir at Hot Springs Landing. These fry averaged 364.78 fish/lb when stocked and had a total weight of 299.49 lb. They averaged 1.90-in in total length.

There were 735 fish with tetraploidy potential, which were kept from the 8500 psi experimental group. They are to be cultured to 10 inches in total length and then intra muscular Passive Integrated Transponder (PIT)-tagged. The PIT-tagging will allow individual fish to be identified pending results of nonlethal blood sampling.

### **1997 Triploid (3N) Projects**

Given the high rates of inducing triploidy by heat shocking in the previous experiment, several ideas were developed to follow up on this success. The HSFH personnel assisted the Magic Valley (Region 4) Fish Hatchery Evaluation personnel, Dave Teuscher and Chuck Alexander, with these experiments.

On 11/20/97, four groups of eggs were heat shocked. A total of 19,973 Hayspur strain rainbow trout green eggs were treated. Of the four groups, eye-up rates ranged from 26.90% to 62.50%. The control group, production lot R92-41, averaged 56.5% eye-up and involved 80,837 green eggs (appendix 6).

Eye-up and hatching occurred in time frames similar to normal production trout eggs. An increase in fish deformities was again noted upon hatching.

To date a total of 15,234 fry are in tanks and will be cultured until they reach 3" in total length. Blood analysis will be performed and WSU staff will determine % triploidy.

The second experiment was undertaken on 12/16/97 and involved a total of 25,006 Hayspur strain rainbow trout eggs. Six groups were heat shocked. Eye-up rates ranged from 40.1% to 60.8%. Three control groups ranged from 51.3% to 55.6% for eye-up rates (appendix 6).

### **Loving Creek**

On August third, the Flyfishers of Idaho (FFI) held a BBQ at HSFH campground to celebrate the completion of a stock water gap on Loving Creek. The purpose of the stock water gap is to control access of a neighbor's livestock to Loving Creek and enhance riparian habitat. This stock water gap is located immediately upstream of the rehabilitated reach. Approximately 400 feet of riparian area was fenced. An area 40 feet by 60 feet was excavated to provide a gentle slope. Geotextile cloth was laid down and covered with river cobble.

Robert Gardner, a cooperative neighbor/rancher agreed to entertain this quality partnership. Others involved were Blaine County Planning and Zoning, Department of Water Resources, Environmental Protection Agency (404 permit), and Myers Excavation. The HSFH personnel consulted with regional fisheries folks, an environmental biologist, and The Nature Conservancy on design considerations.

Funding was made available through the Frank Gift memorial account held by FFI. The account was dedicated to work on Loving Creek. Cost was \$3,900. This amount was reported to Fred Partridge (regional fisheries manager) for matching funds. A spawning gravel enhancement project is planned for the future.

Angler comments in the voluntary sign-in log indicate good fishing, high catch rates, and project support. Waterfowl and waterfowl hunters utilized the project. Birdwatchers, including organized groups from Sun Valley (by the busload), have made the area a destination.

### **Miscellaneous**

The HSFH personnel assisted regional staff with check station duty, artificial simulated animal (ASA) duty, depredation complaints, Big Wood River and Silver Creek electrofishing surveys, Sage Grouse lek counts, enforcement, and winter elk feeding. Sperm from Kamloop trout was bagged and used at Henrys Lake to generate hybrids via delayed fertilization. We also assisted Salmon Region with a brook trout eradication project in Valley Creek. The HSFH provided for the holding of experimental fry involved in Steve Elle's work with Whirling Disease (WHD). Seventy-five brood fish were hauled to McCall for the net pen project. Unfertilized eggs of three females were sent to WSU.

## **ACKNOWLEDGMENTS**

The efforts of Biological Aides Greg Hildebrand, Mountie Morris, Gina Stoneking, Alicia Duzinski, Dustin Strom, and Duncan Oswald need to be recognized. They worked hard and produced a lot of product to make fishing better. In addition, the HSFH would like to thank Job Training Partnership Act (JTPA) personnel: Jeff Crivits, Sheila and Dawn Simmons for help during the summer.

The HSFH would like to thank the people who helped out during the spawning season: Chuck Alexander, Doug Burton, Marcus Day, Roger Elmore, Brad Farner, Kevin Fish, Travis Jackson, Brad Jones, Pete Lundberg, Doug Munson, Fred Partridge, Jeremy Redding, Kurt Schilling, Brent Snider, Bill Stutz, Dave Teuscher, Tom Tighe and Russ Wood.

Appendix 1. Egg production summary at Hayspur Fish Hatchery, 1997.

<b>Species</b>	<b>Total green eggs<sup>a</sup></b>	<b>Total eyed eggs</b>
Kamloops rainbow trout	3,932,738	2,485,706
Hayspur rainbow trout	9,922,761	6,058,623
Colorado River rainbow trout	969,180	383,225
<b>Totals</b>	<b>14,947,800<sup>b</sup></b>	<b>8,927,554<sup>c</sup></b>

<sup>a</sup>Total is displaced (volumetric) of both good and bad eggs taken in 1997.

<sup>b</sup>Does not include 6,420 green eggs from Loving Creek project.

<sup>c</sup>Does not include 5,652 eyed eggs from Loving Creek project.

Appendix 2. Eyed egg shipment summary from Hayspur Fish Hatchery, 1997.

<b>Hatchery</b>	<b><sup>a</sup>Species</b>	<b>Total eggs shipped</b>	<b><sup>b</sup>Estimated value</b>
American Falls	R9	174,761	\$2,621.42
	K1	653,786	\$9,806.79
Ashton	R9	208,096	\$3,121.44
	RR	128,944	\$1,934.16
Cabinet Gorge	R9	1,144,104	\$17,161.56
	K1	217,596	\$3,263.94
Clark Fork	K1	233,854	\$3,507.81
Clear Water	R9	485,172	\$7,277.58
Grace	R9	510,469	\$7,567.04
Hagerman	R9	3,033,851	\$45,507.77
	K1	1,251,295	\$18,769.43
	RR	35,346	\$530.19
Nampa	R9	477,735	\$7,166.03
	K1	123,543	\$1,853.15
	RR	211,313	\$3,169.70
Sawtooth	R9	16,500	\$247.50
<sup>c</sup> Other	R9	7,935	\$119.03
	K1	5,632	\$84.48
	RR	1,100	\$16.50
<b>Totals</b>		<b>8,921,032</b>	<b>\$133,815.52</b>

<sup>a</sup>R9=Hayspur rainbow trout, K1=Kamloops rainbow trout, RR=Colorado River rainbow trout

<sup>b</sup>At contract value of \$15.00/1,000 eggs.

<sup>c</sup>Eggs used for educational programs.

Appendix 3. Hayspur Fish Hatchery stocking summary, 1997.

<b>Fish size</b>	<b>Number of fish</b>	<b>Pounds of fish</b>
Catchables*	61,214	\$26,477.35
Fingerlings	109,866	\$825.43
<b>Totals</b>	<b>171,080</b>	<b>\$27,302.78</b>

\*Include adult brood fish stocked (2,550 fish at 4,656 pounds)

Appendix 4. Hayspur Fish Hatchery Feed Summary, 1997.

<b>Silver Cup</b>			
<b>Date</b>	<b>Size</b>	<b>Amount /pounds</b>	<b>Cost</b>
2/11/97	1/4 in. Brood pellet	12,240	\$ 3,733.20
6/6/97	1/4 in. Brood pellet	11,560	\$ 3,525.80
8/27/97	1/4 in. Brood pellet	11,600	\$ 3,538.00
12/10/97	1/4 in. Brood pellet	13,840	\$ 3,944.40
<b>Total</b>		<b>49,240</b>	<b>\$ 14,741.40</b>

<b>Rangens</b>			
<b>Date</b>	<b>Size</b>	<b>Amount /pounds</b>	<b>Cost</b>
1/23/97	Extruded 450 floating 1/8	50	\$ 15.50
	Extruded 450 floating 1/8	500	\$ 150.00
2/24/97	Trout/Salmon starter #3	50	\$ 28.12
	Trout/Salmon starter #4 crum	100	\$ 30.24
3/19/97	Trout/Salmon starter #2	50	\$ 28.12
5/1/97	Extruded 450 floating 5/32	1,000	\$ 300.00
	Trout grower #4 crumble	150	\$ 45.36
	Trout/Salmon starter #3	100	\$ 56.24
5/30/97	Extruded 450 floating 5/32	1,000	\$ 300.00
	Extruded 450 floating 1/16	200	\$ 94.00
	Trout grower #4 crumble	100	\$ 30.24
6/30/97	Extruded 450 floating 1/16	150	\$ 70.50
	Extruded 450 floating 3/32	250	\$ 77.50
	Extruded 450 floating 5/32	750	\$ 225.00
7/11/97	Extruded 450 floating 5/32	2,000	\$ 600.00
8/8/97	Extruded 450 floating 1/8	500	\$ 155.00
10/17/97	Extruded 450 floating 1/8	200	\$ 62.00
	Extruded 450 floating 5/32	500	\$ 150.00
	Extruded 450 floating 3/16	100	\$ 30.00
10/22/97	Extruded 450 floating 3/16	650	\$ 195.00
12/29/97	Extruded 450 floating 3/16	500	\$ 150.00
	Extruded 450 floating 3/32	50	\$ 15.50
<b>Totals</b>		<b>8,950</b>	<b>\$ 2,808.32</b>

Appendix 5. Egg Data for tetraploid & triploid project at Hayspur Fish Hatchery, 1997.

<b>Pressure and heat shock groups</b>	<b>Total green eggs eggs utilized</b>	<b>Percent eyed up</b>	<b>Percent survival to stocking</b>	<b>Percent induction 4N or 3N</b>
8500 psi	9,382	46.69%	7.98%	5.00%
9000psi	16,756	29.30%	5.48%	0.00%
30.5c	14,627	85.68%	70.19%	0.00%
31.5c	20,003	77.78%	64.77%	0.00%
3N(12-20)	12,571	84.92%	66.79%	77.78%
3N(14-20)	12,299	84.10%	69.24%	85.68%

Appendix 6. Triploid egg data from Hayspur Fish Hatchery, 1997.

<b>Heat shock &amp; MAF</b>	<b>Total green eggs/ treatment</b>	<b>Percent eye-up</b>	<b>Percent of controls</b>
26c 10 MAF	3.424	60.80%	118.5%
26c 15 MAF	2.838	55.10%	103.8%
26c 20 MAF	2.876	58.7%	105.6%
28c 10 MAF	2.648	78.2%	78.2%
28c 15 MAF	2.746	43.1%	81.2%
28c 20 MAF	2.813	44.4%	80.0%
con 10 MAF	2.372	51.3%	
con 15 MAF	2.536	53.1%	
con 20 MAF	2.813	55.6%	

Note: MAF= Minutes after fertilization

**IDAHO DEPARTMENT OF FISH AND GAME**

**ANNUAL REPORT**

**MACKAY FISH HATCHERY**

**1997**

**Phil Coonts  
Fish Hatchery Manager I**

**Robert Hoover  
Assistant Fish Hatchery Manager**

**Mel Hughes  
Fish Culturist**

## INTRODUCTION

The Mackay Fish Hatchery (MFH) is a specialty fish production station located approximately 12 miles north of the town of Mackay in Custer County, Idaho. The hatchery produces salmonids of various species and strains, from 1 to 16 inches in length, for statewide distribution. Funding is obtained under contract from the Federal Aid in Sport Fish Restoration Program, more commonly known as Wallup-Breaux, and from state license monies for fish feed and operational costs. Included in the year's production were 16 lots of fish, comprised of 6 species and 11 different strains.

Rainbow trout *Oncorhynchus mykiss*

Hayspur (ID)

Arlee (Ennis National Fish Hatchery, MT) (2 year classes)

Kamloops (Troutlodge, WA)

Cutthroat trout *O. clarki*

Westslope (McCall) (2 year classes)

Henrys Lake

Brown trout *Salmo trutta*

Plymouth Rock (Saratoga, WY) (2 year classes)

Crawford (Paint Bank Fish Hatchery, VA) (2 year classes)

Rainbow x Cutthroat trout hybrids

Henrys Lake ct females x Ennis NFH rainbow males

Kokanee salmon *O. nerka kennerlyi*

Early (Payette Lk.)

October (Roaring Judy Fish Hatchery, CO)

Grayling *Thymallus thymallus*

## WATER SUPPLY

Water for MFH production is provided by three collection springs in an artesian area at the MFH. The area is fenced off and has been dug out, then filled with cobblestone. The water volume available for MFH production remained consistent with previous years. Flows ranged from 18 to 24 cubic feet per second (cfs). Lowest flows occur during February, while highest flows occur during July. Since the 1983 earthquake, temperatures have varied between the three different springs supplying the MFH; one at 49 F, one at 51 F, and one at 54 F. Incubation temperature is 51 F.

## HATCHERY IMPROVEMENTS

Some projects completed around the MFH the past year include: building a tamper-proof cover over the spring headbox, gating the entry into the six-pack spring area, fabricating self-holding shade-screens for the large raceways, fabricating aluminum-framed and faced screens for the small raceways, radon abatement in all the residences, and a major clean-up of MFH property and local area.

Eighteen new nursery troughs have been financed, but the contracting company has failed to produce a satisfactory trough, yet. We will have new troughs, or our old troughs refurbished before spring arrives.

### **FUTURE NEEDS**

Residence #3 needs the old wood siding replaced. Two garages need to be built to replace residences #2's garage and to provide a garage for residence #3.

### **FISH STOCKED**

Fingerlings of various species and strains were stocked into six regions of the state (Appendix 1). These put-grow-and-take fish numbered 3,732,000, weighing 31,900 lbs.

Catchable rainbow trout (8 inches +) were stocked in the Upper Snake and Salmon regions. These put-and-take fish numbered 95,200 and weighed 50,000 pounds. Catchable brown trout, numbering 5,000 fish and weighing 3,050 lbs, were planted into Horsethief Reservoir.

MFH transferred 3,200 catchables, weighing 1,100 lbs., to Sawtooth Fish Hatchery, from where they were planted into Pettit Lake.

The MFH also reared 22,150 cutthroat, 8,300 rainbow and 3,750 grayling fry for planting into thirty-three high mountain lakes in regions 4 and 6. 4-wheelers, stock, foot and fixed-winged aircraft were used to plant these fish.

The fish transport trucks assigned to MFH traveled on 101 fish stocking trips during the year, logging 35,000 miles. Transport tankers assigned to Fish Transportation hauled four truck-loads of fish for the MFH during the year.

### **FISH FEED**

Fish feed used during the year totaled 101,000 pounds at a cost of \$52,400. Feed conversion averaged 1.21 pounds of feed for every pound of fish produced. Feed cost per pound of fish produced was \$0.519.

BioDiet, Rangen, and Sterling Silver Cup feed were used, depending upon the stock of fish and specifications of the feed contract. All feeds used and amounts are shown in Appendix 3.

## **PUBLIC RELATIONS**

Approximately 800 people toured the MFH during the year. Most visitors come to fish in the diversion pond below the MFH. Scheduled tours were given to eight groups, including boy scouts, elementary school classrooms, and FFA groups. The MFH is assisting Mackay High School in an aquaculture program. The MFH crew and the local conservation officer participate in Idaho's "Adopt a Highway" litter control program. Six miles of Highway 93 along Mackay Reservoir are cleaned biannually. Assistance was also provided for the Hunter Education Program at Mackay School.

## **FISH MARKING**

Of the 1.2 million cutthroat planted into Henry's Lake, 85,000 were adipose-fin clipped prior to stocking. Of the 700,000 cutthroat/rainbow hybrids planted into Island Park Reservoir, 119,000 were adipose-fin (AD) clipped. A crew of three did the clipping during the second week of August.

## **ACKNOWLEDGEMENTS**

During 1997, the MFH crew included; Jason Rheinhardt, Adam Broussard and briefly, Mike Paddock, Biological- Aides. Without Jason and Adam's excellent assistance, much of the work mentioned above would not have been done. Their care and concern enable the MFH to produce the quality of fish we do. Mel Hughes, Fish Culturist, Mick Hoover, Assistant Hatchery Manager, and Phil Coonts, Hatchery Manager, round out the MFH's personnel. Manpower expended totaled 36 permanent man-months and 13.5 temporary man-months.

Appendix 1. Fish production at Mackay Fish Hatchery, January 1 to December 31, 1997.

Species/Strain	Lot number	Source	Received as	Fish Number Received or carried over	Pounds Received or carried over	Yield Number	Yield Pounds	Destination/
Hayspur rainbow trout	6-U-Id-R9	Hayspur	eyed eggs	10,366	28,600	98,300	51,000	97 catchables
Arlee rainbow trout	7-EN-RA	Ennis NFH	eyed eggs	143,000	71	91,000/	18,000	98 catchables
Arlee rainbow trout	8-EN-RA	Ennis NFH, Montana	eyed eggs	167,000	-	150,000	alevins	99 catchables
westslope cutthroat trout	6-U-ID-C2	McCall	fry	245,000	366	2,400	1,805	97 Payette Lake
westslope cutthroat trout	7-U-ID-C2	McCall	fingerlings	19,300	55	1,900	120	98 Payette Lake
Henry's Lake westslope cutthroat trout	7-U-ID-C3	Henry's Lake	eyed eggs	1,300,000	-	1,235,000	5,474	Henry's Lake, Reg 6&7, Mt. Lakes
Plymouth Rock brown trout	5-SR-BN	Saratoga NFH, Wyoming	eyed eggs	5,280	1,550	5,002	3,050	97 Horsethief Resv catchables
Plymouth Rock brown trout	6-SR-BN	Saratoga NFH, Wyoming	eyed eggs	189,000	alevins	157,000	1,600	97 Reg 4,5,6 fingerlings
Crawford brown trout	6-PB-BN	Paint Bank SFH, Virginia	eyed eggs	110,000	alevins	83,000 5,000	3,700 1,400	97 reg 4,5,6 fingerlings 98 Horsethief
Crawford brown trout	7-PB-BN	Paint Bank, Virginia	eyed eggs	360,000	-	320,000	alevins	98 Reg 4,5,6 fingerlings
rainbow x cutthroat	7-U-ID-RC	Henry's Lake	eyed eggs	1,000,000	-	998,000	8,550	Island Pk, Henry's Lk, Horsethief
Deadwood kokanee	6-U-ID-KE	Deadwood Reservoir	green eggs	70,000	-	1,182,000	800	97 Deadwod Resv
Blue Mesa kokanee	6-U-CO-KO	Roaring Judy, Colorado	eyed eggs	1,300,000	-	1,182,000	9,000	97 Reg 2,3,4,6 fingerlings
Payette Lake kokanee	7-U-ID-KE	Payette Lake	green eggs	700,000	-	500,000	alevins	98 fingerlings
grayling	1-7-GR	Ashton Hatch.	fry	6,500		6,250		Reg 4,6 high Mt. Lakes
Kamloops trout	7-Y-WA-K1	Troutlodge, WA	eyed eggs	25,000	-	17,300	6.5	Reg 4,6 high Mt Lakes

Appendix 2. Mackay Fish Hatchery Stocking Summary, 1997.

<b>Not Number</b>	<b># Planted</b>	<b>Lbs Planted</b>	<b>Size Planted</b>
6-U-ID-R9	95,229	49,923	catchable
	3,190	1,100	catchable
7-EN-RA	52,480	1,640	fingerling
7-U-ID-C3	1,234,520	4,171	fingerling
7-U-ID-RC	998,350	8,797	fingerling
6-SR-BN	156,520	1,605	fingerling
6-PB-BN	83,505	3,175	fingerling
5-SR-BN	5,002	3,050	catchable
6-U-ID-C2	24,000	1,805	fingerlings
6-U-ID-KE	29,600	800	fingerlings
6-U-ID-KO	1,182,225	9,885	fingerlings
7-1GR	3,750	2.4	fry
7-K1	15,800	13.6	fry
7-U-ID-C3	22,150	17.9	fry
<b>FingerlingsTotals</b>	<b>3,776,200</b>	<b>31,900</b>	
<b>High Mtn. Fry Totals</b>	<b>34,200</b>	<b>34</b>	
<b>Catchables</b>			
Planted	98,419	52,970	
Transferred	3,190	1,100	
<b>Totals</b>	<b>3,912,009</b>	<b>86,004 pounds</b>	

Appendix 3. Mackay Fish Hatchery Fish Feed Used January 1, 1997 through December 31, 1997

	<b>Lbs Used</b>	<b>Cost</b>
<b>Bioproducts Biodiets</b>		
Starter #1	1,037	\$ 1,348.00
Starter #2	3,790	\$ 4,927.00
Starter #3	6,813	\$ 8,857.00
Grower 1.0	4,268	\$ 5,548.00
Grower 1.3	5,236	\$ 5,550.00
Grower 1.5	2,904	\$ 3,078.00
Grower 2.5	44	\$ 41.00
Sub-Total	24,092	\$29,349.00
<b>Silver Cup Feeds</b>		
Fry Crumble 1.0	2,000	\$ 800.00
Fry Crumble 2.0	1,500	\$ 570.00
Pellets 3/32	5,000	\$ 1,350.00
Pellets 1/8	12,500	\$ 3,375.00
Pellets 5/32	50,000	\$13,500.00
Sub-Total	71,000	\$19,595.00
<b>Rangen Products</b>		
Trout Starter #2	850	\$ 501.00
Trout Starter #3	4,000	\$ 2,360.00
Trout Grower #4	1,100	\$ 634.00
Sub-Total	5,950	\$ 3,495.00
<b>Total</b>	<b>101,042</b>	<b>\$52,439.00</b>



**IDAHO DEPARTMENT OF FISH AND GAME**

**ANNUAL REPORT**

**McCALL SUMMER CHINOOK HATCHERY**

**1997**

**Steven T. Kammeyer  
Assistant Hatchery Manager**

## INTRODUCTION

McCall Summer Chinook Fish Hatchery (MCFH) is located within the city limits of McCall, approximately 1/4-mile downstream of Payette Lake, adjacent to the North Fork of the Payette River. The U.S. Army Corps of Engineers renovated this facility in 1979. The MCFH primary objective is to produce one million summer chinook salmon *Oncorhynchus tshawytscha* smolts annually. Anadromous funding is provided through the Lower Snake River Compensation Program. Facility secondary objectives pertain to resident programs. Funding for the resident fisheries program (April 1 to September 30) is provided from Idaho Department of Fish and Game (Department) license sales revenue.

Payette Lake provides all of MCFH water requirements. Two water intakes are available, which provide limited water temperature control through mixing. The surface intake is located at Lardo Dam at the outlet of Payette Lake. The subsurface intake extends approximately 1/4-mile into Payette Lake at a depth of 50 feet. A 2-foot diameter constriction in the 3-foot diameter mainline limits maximum flow capacity to 20 cubic feet per second (cfs).

Incubation capacity consists of 26 eight-tray Heath style incubator stacks. Additional incubators can be plumbed into four of the early rearing vats if more space is required. Rearing of resident fry is accomplished utilizing several of the 14 indoor vats. Each early rearing vat is 40-ft long and 4-ft wide. Outside rearing space consists of two concrete ponds 196 ft x 101 ft x 4 ft which are used exclusively for summer chinook salmon. Outdoor ponds are joined to a common collection basin, 101 ft x 15 ft x 4 ft, which is used to hold catchable size rainbow trout for redistribution in the summer.

Major resident program objectives are:

- Operate Fish Lake satellite trap for the collection of westslope cutthroat trout *O. Clarki lewisi* eggs.
- Hatch and rear westslope cutthroat, rainbow trout *O. Mykiss*, rainbow-cutthroat hybrids, domestic kamloop and rear golden trout *O. Aquabonita* and grayling *Thymallus arcticus* fry for stocking into high mountain lakes in regions 1, 2, 3B, and 3M.
- Redistribute up to 80,000 catchable-size rainbow trout annually.
- Maintain and provide technical assistance for Payette Lake net pens.
- Maintain the statewide high mountain lakes stocking request database.
- Provide assistance to McCall subregional personnel as needed and available.

## FISH PRODUCTION

### Fish Lake Broodstock

Westslope cutthroat trout used for high mountain lake requests and stocking into Payette Lake are obtained from the naturalized broodstock-spawning project at Fish Lake. Fish Lake is located on Little Creek, approximately seven miles west of McCall, a tributary to the Little Salmon River. The satellite facility is equipped with two 6 ft x 22 ft x 4 ft concrete holding ponds, a 4 ft x 12 ft x 4 ft fish trap and a velocity barrier. Westslope cutthroat trout trapping and spawning operations typically extend from early April through May.

The Fish Lake trap operated from March 29 through May 23, 1997. A total of 347 westslope cutthroat trout were trapped which is the fewest collected in recent years. Of these, 166 were males (47.8%) and 181 were females (52.2%). Average total lengths for males and females were 343.6 mm and 364.7 mm, respectively (Appendix 1).

During the years 1986-1996 westslope cutthroat trout stocked back into Fish Lake as future broodstock were fin-clipped for identification. Of the 347-returning adults in 1997, 128 fish with fin clips (36.9%) returned to the trap. The percentage of marked fish returning to the trap has generated a significant trend indicating a probable loss of natural recruitment to the population (Appendix 2).

Spawntaking operations took place from April 29 to May 23, 1997. A total of 171 females were spawned in 8 lots to produce a green egg take of 209,900 eggs (Appendix 3). Average fecundity was 1,227.5 eggs per female. The average eye-up for these eggs was 87.7% resulting in 184,050 eyed eggs. Of these, approximately 174,900 were initially ponded and available for hatchery programs.

Replacement broodstock from BY96 were released back into Fish Lake on May 21, 1997. These fish numbered 13,000 and averaged 73.5 fish per pound (fpp) at approximately 88.4 mm total length (TL). The fin identification mark for these fish was an adipose fin clip. Replacement broodstock from BY97 could not be overwintered at MCFH this year due to no space being available. Since fall outplants have been shown to have poor survival, it was decided to use excess westslope cutthroat trout fry not needed in the high mountain lakes program as Fish Lake broodstock. This provided a total of 40,500 westslope cutthroat trout fry at an average size of 300 fpp for stocking. These fish were scatter planted around the lake and inlet channel on September 15 (14,750 @ 335.9 fpp), 19th (12,730 @ 296.1 fpp) and 25th (13,020 @ 266.4 fpp). Once overwintering space becomes available again it is anticipated that stocking numbers will once again be reduced to 10,000 annually.

Improvements in 1997 included construction of a more durable spawning shade cover and a lightweight yet durable fish barrier for the lake's spillway. Also, the entire channel leading to the trap was cleared of debris and over hanging willow growth providing a completely unobstructed pathway for fish migration.

### **High Mountain Lake Stocking**

Size is critical to the efficiency of the high mountain lake-stocking program. A desirable stocking size is 600 to 1,200 fpp. Shipments of all species into MCFH are attempted to coincide with westslope cutthroat trout production from Fish Lake so all species may be stocked in the same time frame, reducing the amount of flight time needed to complete fish plants.

Species available and used for high mountain lake stocking in 1997 included: Westslope cutthroat trout, domestic kamloop, and grayling (Appendix 5). Means of stocking included backpacking, aerial plants, and truck plants. All of the high mountain lake's plants were distributed within the six-month resident funding period.

A total of 167 lakes (97.7% of original requests) were stocked with 159,000 fry (90.1% of requests) in 1997 (Appendix 6). Of these, 144 were stocked at a total cost of \$3,937.50 in flight time, or \$27.35 per lake stocked in this manner. Volunteers stocked 24 lakes resulting in savings to the Department of approximately \$656 in comparable flight time costs. One lake was stocked twice with 2 different species. Feed conversions for all species reared averaged 0.99 (Appendix 7).

Requests for westslope cutthroat and domestic kamloop were completely met for all regions. However, no golden trout and only a reduced number of grayling were available this year, which is why all requests were not met. Requests met for individual regions ranged from 74.8% to 100.0% and depended on how many grayling and golden trout were requested (Appendix 6).

Following the completion of high mountain lake stocking flights, remaining excess fry were stocked in McCall area waters coordinated through the McCall subregional Fish Manager. An extra 30,000 westslope cutthroat were added to the Fish Lake replacement broodstock allocation and 12,000 excess domestic kamloop were stocked into Goose Lake (3,000) and Granite Lake (9,000).

### **Catchable Redistribution**

During the period May 19 to August 28, 1997 a total of 71,900 catchable size domestic kamloop were stocked into 34 water bodies in the McCall vicinity (Appendix 8). An additional 1,270 catchables were transferred out of MCFH for free fishing day clinics located at Rapid River Hatchery and Council. A total of 3,025 miles were driven at an approximate cost of \$2,900 to complete 80 stocking trips.

In addition to the routine catchable redistributions, MCFH personnel also participated in fish transfers with Columbia Basin Fish Hatchery, WA by providing them with crappie held at Oxbow Hatchery in return for Tiger Muskies *Esox lucius* which MCFH personnel picked up in Moses Lake, WA (May 12 and July 8, 1997) and then stocked out. Hatchery personnel assisted with transporting and stocking channel catfish held at Oxbow Fish Hatchery. Two trips to Hayspur Fish hatchery were also completed by MCFH in order to pickup broodstock culls. On May 16, 1997 seventy-five adults (age 5+) were stocked into Rowland Pond and 41 adults (age 3+) were added to the Payette Lake net pens on June 26, 1997. Finally, Waha Reservoir was stocked with splake transported by MCFH personnel.

## Payette Lake Net Pens

This was the seventh year for net pen production of trout in Payette Lake. The net pen project was designed to be sponsored and operated by the community with technical assistance provided by MCFH personnel. Once again, two nets, approximately 28 feet deep, were used with no significant fish mortalities experienced. However, instead of westslope cutthroat trout, net pens were loaded with catchable domestic kamloop trout. These fish perform better than westslope cutthroat in that type of rearing condition.

Currently the McCall chapter of Trout Unlimited (TU) is providing the primary community support for this project. Trout Unlimited members organized a schedule of several local businesses to perform daily feeding chores. Additionally, TU arranged to replace one dock section (including its disassembly) with another one located by MCFH personnel. A workday was sponsored by TU to make general repairs to the entire dock system leading out to the net pens. Trout Unlimited also replaced a gumball machine next to the net pens so individuals could purchase small amount of feed to give to the fish. The cost of the feed purchased in 1997 was equally divided between TU and MCFH. The loading of the net pens and the first fish release was completed with TU assistance.

Total production from the net pens in 1997 was approximately 4,900 domestic kamloop or 3,070 pounds released (approximately 1,621 pounds of gained weight). To accomplish this, a total of 1,950 pounds of feed was fed out with an experienced conversion of 1.20. Fish grew exceedingly well under net pen rearing conditions. Net pens were initially loaded on June 17, 1997 with 5,000 domestic kamloop at an average size of 3.45 fpp (9.0 inches TL). An additional 41 broodstock culls from Hayspur Hatchery were added to the nets on June 26. On July 19, TU members assisted with the release of 500 fish from each net (2.3 fpp @ 10.0 inches TL). The next release occurred on August 20. At this time approximately 1,500 fish (1.7 fpp @ 11.2 inches TL) were released with 1,000 of them receiving a jaw tag in a promotion sponsored by Jack Daniels Distilling Co. The final release occurred on September 16 with 2,400 fish (1.4 fpp @ 12.3 inches TL).

Total costs incurred as part of the net pen project in 1997 were estimated at \$1,750. Of this TU and community businesses contributed approximately \$1,000 in donated labor and feed purchases. The cost estimate for MCFH was \$750, which included personnel costs for set up, removal, clean up, and purchase of one half of the feed used.

On June 9, 1997, MCFH personnel drove to Mackay Hatchery and returned with approximately 24,000 westslope cutthroat trout (13.3 fpp) from the BY96 spawn take at Fish Lake. These fish were then scatter planted around Payette Lake. MCFH transferred 25,000 westslope cutthroat trout (475 fpp) to Mackay Fish Hatchery on September 4, 1997 to overwinter. These fry represented a random cross-section of the spawn take at Fish Lake in 1997. These fish will be scatter planted into Payette Lake in the spring of 1998.

### **Hatchery/ Program Improvements**

The main program improvement in 1997 was the transfer of a trailer to the MCFH resident program. This trailer should prove to be a considerable asset for use at Fish Lake. Minor program improvements in 1997 included clearing the channel leading to the fish trap at Fish Lake of all debris and overhanging vegetation and construction of a more durable spawning shade cover and spillway fish barrier at Fish Lake.

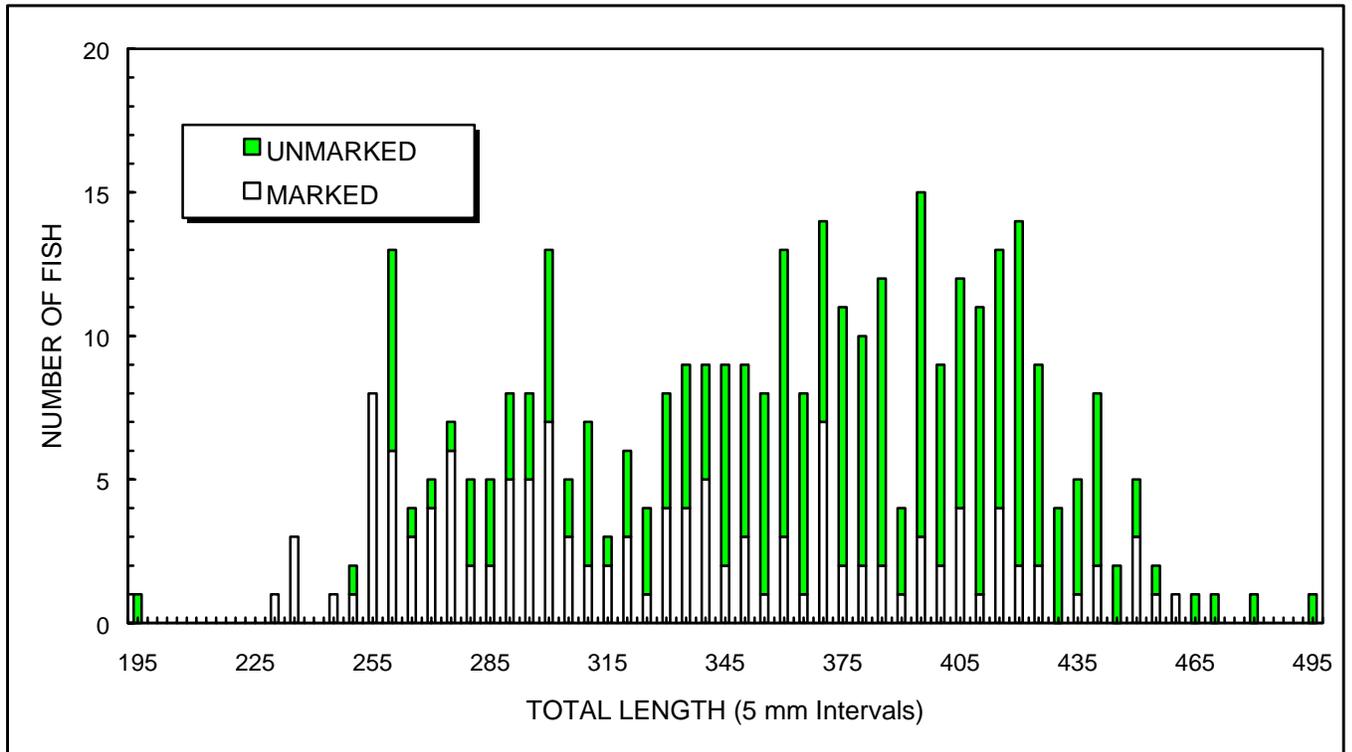
### **Public Relations**

Two outdoor school fish stocking presentations were made for approximately 60 sixth graders on Cascade Reservoir. A similar presentation was conducted as part of the Fish Habitat Day activities on Cascade Reservoir for approximately 150 elementary age students. Two in class presentations were made for Sally Smelsner's 2nd grade class at McCall Elementary. Excess kamloop fry were provided for rearing in their classroom aquarium throughout the school year. They were then released into the North Fork of the Payette River in the spring, which was combined with a tour of MCFH. Resident funded personnel participated in Free Fishing Day activities at Rowland Pond again this year with fish stocking scheduled to enhance participating kids fishing experience. Many parents were present which made this a good experience for the children. Volunteers assisted with several resident projects including stocking 24 high mountain lakes (12 volunteers), high mountain lake flight (1 volunteer), catchable redistribution (2 volunteers), spawning at Fish Lake (1 volunteer) and multiple volunteers assisting with aspects of the Payette Lake net pens.

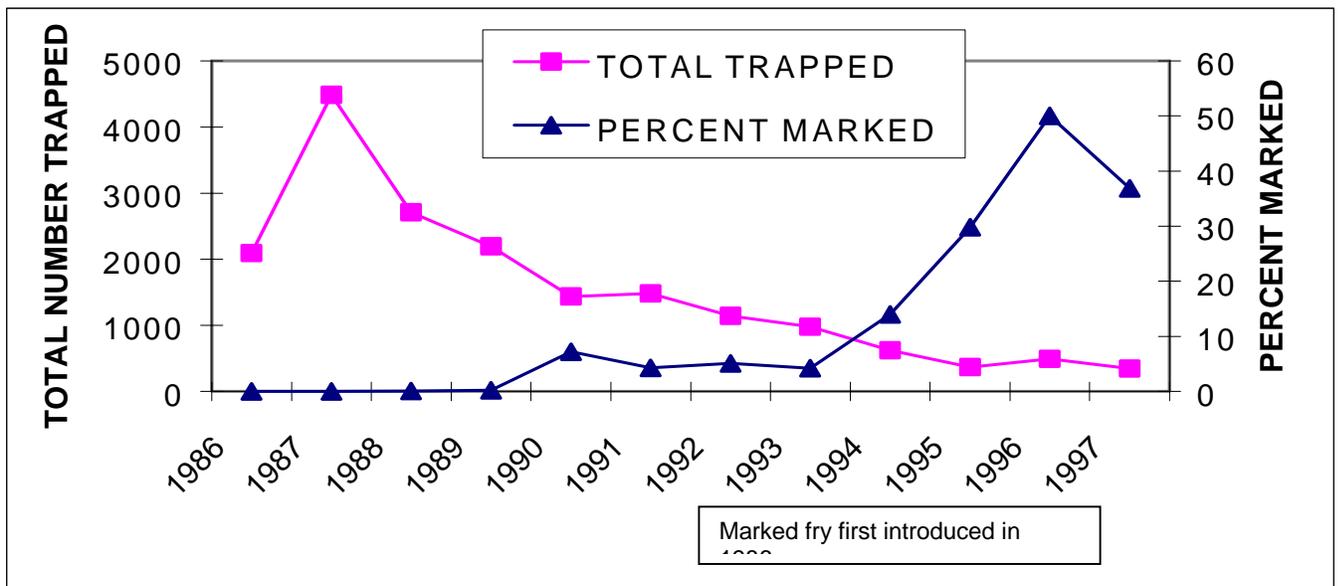
### **Acknowledgments**

Accomplishments made through the resident program in 1997 could not have been done without the support of the entire staff at MCFH. The assistant hatchery manager wishes to thank Gene McPherson, MCFH Fish Manager II, for his advice and assistance on various resident projects as well as for generously allowing anadromous funded personnel to work on resident projects. Individuals assisting on resident endeavors at MCFH in 1997 included: Joel Patterson (MCFH Fish Culturist) and seasonal temporaries Stu Chamberlain, Jeremy Anderson, Bob Welch, Shane Davila, Jake Shea, Randy Martinez, Dan Smith.

Appendix 1. Cutthroat trout length frequency Fish Lake. McCall Fish Hatchery, 1997.



Appendix 2. Fish Lake historical trapping data, 1986-1997.



Appendix 3. Results of west slope cutthroat trout spawn take, Fish Lake, McCall Hatchery, 1997.

Females spawned	Green eggs taken	Percent eye-up	Eyed eggs available	Average fecundity
171	209,900	87.7	184,050	\$1,227.50

Appendix 4. Westslope cutthroat trout broodstock replacement and returns at Fish Lake, 1986-1997.

Year released	Number released	Mark type released	Total adults trapped	Total marks trapped	LV	AD	RV	PR/LP	Eroded fins	Eroded fins/AD
1986	5,490	LV	2,091	0	0	0	0	0	0	0
1987	4,000	AD	4,486	0	0	0	0	0	0	0
1988	3,310	RP	2,708	1	0	0	0	1	0	0
1989	4,000	RV	2,197	4	0	0	0	4	0	0
1990	4,000	LV	1,437	103	91	9	2	1	0	0
1991	4,200	AD	1,480	63	21	33	2	7	0	0
1992	4,200	RV	1,145	58	20	13	15	10	0	0
1993	4,145	AD	980	41	20	0	20	1	0	0
1994 fry	3,262	LV								
net pens	1,042	Eroded fins	622	87	69	7	9	1	0	0
1995 net pens	2,015	AD/EF	366	109	6	40	59	1	3	0
1996 fingerling	5,300	RV								
net pens	700	Eroded fins	490	245	2	22	192	0	27	2
1997 fingerling (BY96)	1,300	AD								
fry (By97)	40,500	NONE	347	128	17	22	11	0	76	2

Appendix 5. Species stocked out, by region, as part of the high mountain lake program, 1997.

	<b>Westslope cutthroat</b>	<b>Domestic kamloop</b>	<b>Arctic grayling</b>	<b>Total stocked</b>	<b>Total Lakes stocked</b>
Panhandle	6,250	4,750	4,900	15,900	8
Clearwater	26,700	2,500	- 0 -	29,200	32
Southwest (3B)	36,250	5,500	1,340	43,090	50
Southwest (3M)	26,250	20,700	17,010	63,960	66
Salmon	- 0 -	7,750	- 0 -	7,750	11
<b>Totals</b>	<b>95,450</b>	<b>41,200</b>	<b>23,250</b>	<b>159,900</b>	<b>167</b>

Note: Table does not include excess fry redistribution in Southwest region that are not part of the high mountain lake program.

Appendix 6. High mountain lake stocking requests by region, 1997.

<b>Region</b>	<b>Initial request (all species)</b>	<b>Stocked/transferred (all species)</b>	<b>Percent of request met</b>
Panhandle	21,250	15,900	74.8
Clearwater	29,200	29,200	100.0
Southwest (3B)	44,750	43,090	96.3
Southwest (3M)	74,450	63,960	85.9
Salmon	7,750	7,750	100.0
<b>Totals</b>	<b>177,400</b>	<b>159,900</b>	<b>90.1</b>

Note: Requests not met were due to no golden trout and only limited arctic grayling being available.

Appendix 7. Feed usage and conversion data, McCall Fish Hatchery, 1997.

<b>Species</b>	<b>Number stocked</b>	<b>Feed used</b>	<b>Weight gained</b>	<b>Conversion</b>	<b>Cost/ Pound</b>	<b>Cost/ Fish</b>
<b>Fish Lake Preplacement Brookstock</b>						
Westslope cutthroat (BY 96)	13,000	280.1	173.7	1.61	\$2.10	\$0.03
Westslope cutthroat (BY 97)	40,500	126.4	125.7	1.01	\$1.31	\$0.00
<b>High Mountain Lake Stocking</b>						
Westslope cutthroat (BY97)	123,450	87.8	105.4	0.83	\$1.08	\$0.00
Domestic Kamloop	53,200	109.8	99.8	1.10	\$1.43	\$0.00
Arctic Grayling	23,450	9.2	2.9	3.19	\$4.15	\$0.00
<b>Payette Lake Net Pens</b>						
Domestic Kamloop(BY96)	4,900	1,950.0	1,621.4	1.20	\$0.37	\$0.12
<b>Total</b>	<b>258,500</b>	<b>2,563.3</b>	<b>2,128.9</b>	<b>1.20</b>		

Note: Data includes excess fry redistribution and westslope cutthroat transferred to Mackay Hatchery.

Note: Data reflects total net pen production

Appendix 8. Total production and distribution at McCall Fish Hatchery, 1997.

<b>Species</b>	<b>Eggs/ fish received</b>	<b>Fish stocked out</b>	<b>Pounds Gained</b>	<b>Cost per Lb gained</b>	<b>Cost per fish stock/produced</b>
<b>HIGH MOUNTAIN LAKE PROGRAM</b>					
Westslope cutthroat	209,900 green	98,450	61.3		
Domestic Kamloop	56,500 eyed	41,200	37.3		
Grayling	27,200 fry	23,250	2.9		
<b>subtotal</b>	n/a	162,900	101.5	\$38.79	\$0.024

Note: Cost based on flight time expenses of \$ 3,938

**PAYETTE LAKE AND NET PEN PROGRAM**

Domestic Kamloops (BY96)	5,000	4,900	1,621.40	\$0.46	\$0.153
	catchable	net pen reared		(feed/manpower)	
Westslope	24,000	24,000	- 0 -	n/a	\$0.031
Cutthroat (BY96)	juvenile	scatter plant			(transport)
Westslope		25,000	46.3	\$1.62	\$0.003
Cutthroat (BY96)	n/a	sent to Mackay		(feed)	
<b>sub-total</b>	n/a	53,900	1,667.70	\$0.91	\$0.028

Note: Cost based on approximate MCFH contribution of \$ 1,525

**CATCHABLE REDISTRIBUTION PROGRAM**

Domestic Kamloop	74,180	71,900	[21,363]	\$0.14	\$0.040
<b>subtotal</b>	74,180	71,900	[21,363]	\$0.14	\$0.040

Note: Cost based on MCFH transport expenses of \$2,900 (does not include 1,270 catchables transferred)

**FISH LAKE BROODSTOCK REPLACEMENT**

Westslope Cutthroat (BY96)	na/	13,000	173.7	\$2.10	\$0.028
		juvenile			
Westlope Cutthroat (BY97)	n/a	40,500	125.7	\$1.32	\$0.004
<b>subtotal</b>	na/	53500	299.4	\$1.77	\$0.010

Note: Cost based on feed expenses.

**EXCESS FRY REDISTRIBUTION**

Domestic Kamloops	n/a	12,000	61.4	\$0.53	\$0.003
<b>subtotal</b>	n/a	12,000	61.4	0.53	\$0.003

Note: Cost based on feed expenses of approximately \$32.40.

<b>TOTAL</b>	<b>n/a</b>	<b>354,200</b>	<b>2130</b>	<b>16.57</b>	<b>\$0.100</b>
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Note: Cost based on MCFH resident budget expenditures of \$35,300.

**IDAHO DEPARTMENT OF FISH AND GAME**

**ANNUAL REPORT  
MULLAN FISH HATCHERY  
1997**

**Mary Van Broeke  
Laborer**

## **INTRODUCTION**

The Mullan Fish Hatchery (MUFH) is a resident species redistribution station located four miles east of Mullan, Idaho. The Shoshone County Sportsmen's Association owns the MUFH buildings and grounds. Shoshone County funds maintenance of the physical plant. The Idaho Department of Fish and Game (Department) funds personnel costs production costs, and equipment with fishing and hunting license fee revenue. The facility operates as a satellite of the Clark Fork Hatchery with one temporary employee on station year-round.

The hatchery receives water from the South Fork of the Coeur d'Alene River and the Little North Fork of the Coeur d'Alene River. Two (6 ft x 65 ft) concrete raceways, as well as one (12 ft x 65 ft) concrete raceway and three dirt ponds (30 ft x 100 ft), are used to hold fish prior to stocking into the Coeur d'Alene and St. Joe river drainages. One dirt pond has been developed as a show pond complete with a visitor's access deck, information board, and a feed dispenser.

The Mullan facility plays a vital role in supporting the put-and-take rainbow trout *Oncorhynchus mykiss* fishery. From this location, daily trips are made onto the Coeur d'Alene and St. Joe rivers, from May to September, providing the frequent stocking service needed to support such a fishery. The close proximity to a Shoshone County park encourages the highest visitor attendance rate of any hatchery in the Panhandle Region.

## **HATCHERY IMPROVEMENTS**

There were no major hatchery improvements during 1997. The facility continues to operate with minimal funding for operations only.

The fish transport tank was replaced during 1997. The Department personnel at the Eagle truck shop obtained by a surplus water transport tank, which was stripped and modified for fish release. Personnel at the MUFH then modified the tank with new support ramps, a pressure sensitive oxygen alarm, installed new micro pore gas diffusers, and a recirculation pump. The tank now provides the capability to haul up to 750 lbs of trout. This nearly doubled the haul capacity with the older tank.

## **FISH STOCKED OR TRANSFERRED**

Approximately 33,000 rainbow trout nine-inches long were released in waters of the Coeur d'Alene, St. Joe, and St. Maries river drainages from May to August to support a put-and-take fishery. Although the normal stocking allocation was 54,000 rainbow trout, high water, road closures, and lost stocking sites reduced the releases in 1997. All trout released from the MUFH were reared at the Clark Fork Hatchery. Fish were reared to full release size and then transported from Clark Fork to Mullan for redistribution. The hatchery worker loaded the fish into a 500-gallon pick-up truck mounted tank and delivered them to hundreds of miles of stream. The distribution schedule requires eight to 10-hour trips, four to five days each week or 59 days on the road out of 70 available working days in the summer season. While lake stocking is usually accomplished with single large releases, river stocking is much more labor intensive. Even relatively small numbers of fish require multiple stops to distribute the fish effectively for sportsmen's access.

## **PUBLIC RELATIONS**

The MUFH is located adjacent to a popular Shoshone County "day use" park. As a direct result, the hatchery receives a much higher visitor load than would be expected due to its remote location. The hatchery serves the highest number of visitors of any hatchery in the Panhandle Region, with over 5,000 people touring the grounds in 1996.

The hatchery maintains a covered visitor information center with a map of stocking areas and information about the special harvest regulations in the Coeur d'Alene River and St. Joe River drainage.

On June 7, one of the dirt rearing ponds was stocked with rainbow trout to provide fishing for a Free Fishing Day clinic. Personnel from the Panhandle Region, U.S. Forest Service, and the Shoshone County Sportsmen's Association provided training and advice to more than 110 participants that day with over 170 rainbow trout caught. The location was particularly beneficial in providing access for persons having limited mobility. As usual, the Fishing Clinic received good reviews in the local newspaper and boosted the Department's image in the Silver Valley.

## **SPECIAL PROJECTS**

### **Water Quality Studies**

The MUFH again assisted in a rearing and survival assessment for westslope cutthroat trout *O. clarki lewisi* and rainbow trout in South Fork Coeur d' Alene River water. This work is part of a major research project evaluating toxicity and water quality degradation following mining activity in the Silver Valley. Personnel from Environmental Services for Industry and Government (EVS) conducted the study utilizing fry provided from the Sandpoint Fish Hatchery.

### **Hatchery Trout Evaluation**

A hatchery trout evaluation was conducted on both the St. Maries River and Big Creek (St. Joe River) during 1997. The study was undertaken to evaluate the return rate for rainbow trout stocked to the put and take fishery. The results are provided in Appendix 1.

Appendix 1. Number of trout planted tagged and returned from the St. Maries River and Big Creek (St. Joe River), Idaho, 1997.

<b>Water</b>	<b>Number planted</b>	<b>Number tagged</b>	<b>Mean length</b>	<b>Number returned</b>	<b>Percentage returned</b>
St Maries River	2,454	295	221	5	1.7
Big Creek	1,008	99	222	9	9.1

**IDAHO DEPARTMENT OF FISH AND GAME**

**ANNUAL REPORT  
NAMPA FISH HATCHERY  
1997**

**Rick Alsager  
Fish Hatchery Manager II**

**Dan Baker  
Assistant Fish Hatchery Manager**

**Bob Turik  
Fish Culturist**

## INTRODUCTION

Nampa Fish Hatchery (NFH) is a resident trout rearing facility located one mile south of Nampa. The NFH water is supplied by eight pump assisted artesian wells with a maximum flow of 40 cubic feet per second (cfs) of 59°F water. Built in 1975 and purchased by the Idaho Department of Fish and Game (Department) in 1982, fish rearing facilities consist of a hatchery building containing 4 upwelling incubators and 4 early rearing vats with attached temporary employment quarters. Outside rearing tanks including 16 fry raceways, 3 fingerling/broodstock raceways and 10 production raceways. Sixteen upwelling incubators are available for use in the fry raceways to increase egg incubation capacity. A settling pond treats flows from the production units before discharge into Wilson Springs Ponds and Wilson Springs Drain.

## FISH PRODUCTION

The NFH produced 1,250,577 fish weighing 207,214 pounds during the 1997 fish year. Fish transferred to other hatcheries are included in the total number and pounds produced. Kamloops and rainbow trout *Oncorhynchus mykiss* comprised 85% of the fish stocked from NFH. In addition, brown trout *Salmo trutta*, Lahontan cutthroat trout *O. clarki henshawi*, and chinook salmon *O. tshawytscha* were produced at NFH during 1997 (Appendix 1). Another 4,000 fish weighing 400 pounds were produced at NFH and given to schools for dissection and department personnel for various research and study programs. These fish were not included in overall production numbers.

The total number of each species/strain stocked is listed in Appendices 2, 3 and 4. A total of 1,910,391 eyed eggs and 60,194 fry were received during the 1997 fish year (Appendix 5).

## FISH STOCKED/TRANSFERRED

The NFH personnel stocked or transferred 1,504,187 fish, weighing 223,629 pounds, during the 1997 fish year. A total of 388 plant sites were stocked by NFH during 1997. The Southwest Region received 372,729 catchable trout weighing 126,639 pounds.

A total of 270,396 Kamloops trout catchables (76,105 pounds) were transferred to other hatcheries throughout the state (Appendix 4). Fingerlings transferred from NFH included 11,500 Colorado River rainbow trout (500 pounds); 5,020 brown trout (16 pounds) and 135,520 Hayspur rainbow trout (1,125 pounds). No broodstock fish were reared at NFH during the 1997 season.

## FISH TRANSPORTATION

Fish transport operators stationed at NFH stocked waters in all regions throughout the state of Idaho and transferred fish to and from 26 different state and national fish hatcheries. They transferred endangered sockeye salmon *Oncorhynchus nerka* from Eagle Fish Hatchery to Big Beef Fish Hatchery (National Marine Fisheries Service (NMFS) operated near Silverdale, WA.). A trip was also made to Oklahoma (Durant State Fish Hatchery) to pick up channel catfish *Ictalurus punctatus* fingerlings which were stocked in reservoirs throughout Idaho. Tiger muskie were transported from Tionesta Fish Hatchery in Pennsylvania and Wray Fish Hatchery in

Colorado. These fingerlings were stocked into southeast Idaho reservoirs and Cascade Reservoir. The transport operators stationed at NFH made 154 trips totaling 61,000 miles, during 1997.

The NFH's transport operators stocked rainbow trout fingerlings from Lyons Ferry Fish Hatchery (150,146 fish, 3,491 pounds) into the Clearwater Region waters. They also stocked chinook salmon and B-run steelhead smolts from Clearwater Fish Hatchery and assisted with the transportation of chinook salmon smolts from McCall Fish Hatchery. Our drivers also assisted transporting and stocking surplus A-run adult steelhead from Oxbow Fish Hatchery; steelhead were released into the Payette (101) and Boise (349) rivers. 1997 also saw a surplus of adult chinook salmon returning to Rapid River Fish Hatchery and the SF Salmon River trap. Transport drivers from NFH assisted with transporting and releasing adult chinook salmon back into the Little Salmon River and released 594 adult salmon into the Boise River and released 60 adult salmon into the Payette River.

### **BROWN TROUT**

Brown trout eyed eggs were received from Saratoga National Fish Hatchery. A shipment of 157,075 eyed eggs arrived in December of 1996. From this group, a total of 103,634 fingerlings were released in the Panhandle and Southwest regions for an overall survival rate of 66.0% from eyed egg to plant (Appendix 3).

### **LAHONTAN CUTTHROAT TROUT**

During the 1997 fish year, NFH stocked 105,085 Lahontan cutthroat trout into lakes and reservoirs located in the Southwest and Upper Snake regions. All Lahontan cutthroat eggs were received from Omak Fish Hatchery in Washington. The Southwest Region fish were stocked as fry and fingerlings (Appendices 2 and 3), while the Upper Snake Region's fish were stocked as fingerlings into Mud Lake and Sheridan Reservoir (Appendix 3). Estimated survival from eyed egg to fingerling was 36.3%. Low survival was due to handling problems during shipping. The two egg shipping boxes arrived damaged and upside down. The eyed eggs were not enumerated at NFH to avoid further damage. An estimated 60% to 70% mortality had occurred during shipping.

### **FALL CHINOOK SALMON**

The NFH raised fall chinook salmon for stocking as smolts into Coeur d' Alene Lake. Personnel from Sandpoint Fish Hatchery spawned adult fall chinook returning to the trap at Wolf Lodge Creek, a tributary stream that runs into Coeur d' Alene Lake. The eggs were incubated at Sandpoint Fish Hatchery (SFH) and transferred to Cabinet Gorge Fish Hatchery after the water supply line broke, leaving the SFH without water. Cabinet Gorge transferred 22,240 fry to NFH in February 1997. The production goal of 77,000 smolts was adjusted to account for the low number of fry available. Survival from fry to smolt was excellent with this group. Of the 22,240 fry transferred to NFH, 22,620 smolts were stocked for a survival of 101.7% (The discrepancy in numbers can be accounted for due to sampling and displacement errors, actual mortality in this group was 220 fingerlings). Receiving fry from Sandpoint and Cabinet Gorge Fish Hatchery continues to be very successful and will continue in the future. Eyed eggs

received from Sandpoint have had high mortality at the time of hatching due to the 59° F water at NFH. This scenario of receiving feeding fry in place of eyed eggs should be continued.

The NFH stocked 12,650 chinook smolts back into Coeur d' Alene Lake. Additional smolts were stocked into Deadwood Reservoir (5,005 fish) and Arrowrock Reservoir (4,965 fish). These additional stockings will be continued in future years due to the unavailability of disease-free Atlantic salmon *Salmo salar* eyed eggs.

### **COLORADO RIVER RAINBOW TROUT**

The NFH reared Colorado River rainbow trout for the second time. Eyed eggs were received from Hayspur Fish Hatchery in January to produce a catchable trout by late fall. These fish were to be stocked in larger rivers in the Southwest and Magic Valley Regions. They grew slowly, reaching a length of six inches by October, and were planted as fingerlings. One group was transferred to Clark Fork Fish Hatchery (11,500 fish weighing 500 pounds) to be reared to catchable size before release.

The Colorado River rainbow trout performed similar to the cutthroat and brown trout at NFH. Of the 224,509 eyed-eggs received, 147,743 fingerlings were released or transferred. This gave us an overall survival of 65.8%.

### **SPECIAL STUDIES**

The NFH assisted resident research biologists with a Mt. Lassen rainbow trout triploid study. Overall these groups performed similar under hatchery rearing conditions. The triploid group had a slightly higher mortality from hatch to feeding fry (triploids: 65.4% survival; controls: 74.2% survival). These two groups were jaw-tagged before release, 300 from each group. Seventeen streams were identified throughout the state and catchables were stocked May through August. Tag returns are still being reported, but initial results showed no difference in return to creel. Of the 5,100 catchables stocked from each group, 918 control tags had been returned and 931 triploid tags had been returned. This study will be repeated in 1998. Jeff Dillon was the project leader in 1997. Dave Teuscher from the Magic Valley Region will be project leader for this study in 1998.

Nampa resident research biologists also studied injuries caused from electroshocking on 500 catchables at NFH. This study showed injuries caused from electroshocking to decline over a five-week period. Initial injuries caused from electroshocking were 1.8 injuries per catchable and declined to 0.6 injuries per catchable after 36 days. For more information on this study contact Steve Elle project leader. This project is scheduled to be duplicated in 1998.

## **FISH FEED**

A total of 233,060 pounds of feed was fed during 1997 at a cost of \$94,501 (Appendix 6). Rangen's Inc. made up 87% of the feed purchased by weight, with Bioproducts making up the remaining 13% (Appendix 6). The overall feed conversion was 1.12 pounds of feed fed to produce one pound of fish.

## **FISH SPAWNING**

### **Early Kokanee**

The NFH continues to operate the early kokanee salmon *O. nerka kennerlyi* trapping and spawning project. Due to low numbers of kokanee returning in 1996 and an expected low number in 1997 from Deadwood Reservoir, the project was moved to the North Fork (NF) Payette River approximately five miles above Payette Lake. Approximately 50,000 to 60,000 kokanee were expected to spawn in the NF Payette River (approximately half of this number was to be released above the weir for natural production). After meeting with biologists in McCall a weir site was selected and a weir was installed on August 19, 1997. The weir was monitored by a bio-aide throughout the run. An estimated 12,000 fish were released above the weir throughout the run for natural production. This number was lower than requested due to lower than expected trap numbers. An estimated 10,000 to 15,000 kokanee attempted to spawn below the trap site. This is an area that historically has not been used for spawning, but due to high run-off the past two years, this area has improved spawning habitat. The first kokanee adults were trapped on September 1, 1997, and trapping continued through September 25, 1997. The main weir and trap was removed on September 30, 1997. The Morrison Knudsen Nature Center received 300 adult kokanee for viewing at the Nature Centers ponds.

All fish were spawned at the trap site. A green egg yield of 736,737 eggs was taken from 2,092 females for a fecundity rate of 352 eggs/female (Appendix 8). Average total length of kokanee females was 273.0 mm, with males averaging 275.3 mm (Appendix 9). Percent survival to the eyed egg stage was 78.9%.

Eggs were shipped to Mackay Fish Hatchery via fixed-wing aircraft. Shipping techniques were similar to those used during previous years with the exception that the eggs were driven to McCall Airport. The Department contracted the flying service with McCall Air Taxi.

## **HATCHERY IMPROVEMENTS**

Several important improvements were implemented at NFH during 1997:

- Landscaping around residences #2 and #3 was improved.
- Replaced wood headbox covers with metal deck plate.
- Started improving NFH building and grounds to meet handicap codes.

- Installed window in garage of residence #2.

NFH improvements scheduled for 1998 include:

- Paint exterior of Residences #2 and #3.
- Paint interior of residence #2.
- Continue landscape improvements.
- Continue improving handicap accessibility.
- Modify bird screening over B-pond headbox to improve access.
- Build visitor information display.
- Replace 1989 GMC one-ton with new Dodge 1-ton.
- Repair and seal feed bins.

## **PUBLIC RELATIONS**

As in past years, NFH was a focal point for many visitors, tours, and special groups. In 1997, an estimated 4,750 tourists visited the NFH. Most visitations came through the late spring and summer months. A total of 60 guided tours were given to area school, church, and boy scout groups. The disabled veterans were allowed to fish the settling pond five times during the summer months, as were the handicapped patients from the Idaho State School, who fished the pond on four trips. The settling pond was also opened to fishing on Free Fishing Day. The NFH and Southwest Region personnel hosted the Free Fishing Day clinic, which saw 250 visitors/fishermen, with an estimated 750 fish caught. The largest fish caught was a five-pound rainbow trout and several more over four pounds. Free Fishing Day at NFH was enjoyed by many and needs to be continued in the future. We felt the "kids only" session from 8:00 a.m. to noon continued to be very popular and successful.

## **ACKNOWLEDGEMENTS**

The NFH staff for 1997 included Rick Alsager, Fish Hatchery Manager II; Dan Baker, Assistant Fish Hatchery Manager; Bob Turik, Fish Culturist; Gary Ady, Fish Transport Operator; and Dick Bittick, Fish Transport Operator. Bio-aides for 1997 included Dianne Wells, Phil Anderson, Greg Kollman, Howard Garwick and Chuck Kiester. Volunteers have also helped on a number of projects throughout the year donating over 272 hours of time.

Appendix 1. Fish requested and produced at Nampa Fish Hatchery, 1997.

<b>Species/Strain</b>	<b>Size</b>	<b>Production goal</b>	<b>Actual production</b>	<b>% of goal achieved</b>
Lahontan cutthroat trout	1-3 inches	53,000	39,110	73.80%
Lahontan cutthroat trout	3-5 inches	100,000	65,975	66.00%
Brown trout	3-5 inches	60,000	103,634	172.70%
Hayspur rainbow trout	3-5 inches	458,000	459,506	100.30%
Kamloops trout	3-5 inches	51,000	42,134	82.60%
Colorado River rainbow trout	4-6 inches	115,000	147,743	128.50%
Fall chinook salmon	5-6 inches	77,000	22,620	29.40%
Mt. Lassen rainbow trout	8-12 inches	17,000	33,995	200.00%
Kamloops trout	8-12 inches	616,950	602,081	97.60%
Kamloops trout	> 12 inches	0	1,150	NA
<b>Totals</b>		<b>1,547,950</b>	<b>1,517,948</b>	<b>98.10%</b>

Appendix 2. Fry production at Nampa Fish Hatchery, 1997.

<b>Species/strain</b>	<b>Source and date</b>	<b>Number received</b>	<b>Yield number</b>	<b>Yield Pounds egg to plant</b>	<b>% Survival</b>	<b>Destination</b>
Lahontan cutthroat trout	Omak 5/97	100,000	39,110	35.45	39.1%	Southwest Region
<b>Totals</b>		<b>100,000</b>	<b>39,110</b>	<b>35.45</b>	<b>39.1%</b>	

Appendix 3. Fingerling production at Nampa Fish Hatchery, 1997.

Species/ strain	Source	Date	Number received	Yield number	Yield pounds	% Survival egg to plant	Destination
Hayspur rainbow trout	Hayspur	12/96	158,648	140,380	4,230	88.50%	Magic Valley Region
brown trout	Saratoga	12/96	157,075	103,634	2,441	66.00%	Southwest Region Clark Fork Hatchery
Colorado River rainbow trout	Hayspur	1/97 2/97	224,509	147,743	4,795	65.80%	Panhandle Region Southwest Region Magic Valley Region Clark Fork Hatchery
fall chinook salmon <sup>a</sup>	Cabinet Gorge	2/97	22,240	22,620	845	NA	Panhandle Region Southwest Region
Hayspur rainbow trout	Hayspur	2/97	186,074	139,102	2,930	87.80%	Southwest Region Magic Valley Region
Hayspur rainbow trout <sup>b</sup>	Hayspur	2/97	25,112	20,180	280	NA	Southwest Region
Kamloops trout <sup>c</sup>	Hayspur	2/07	59,402	42,134	1,000	70.90%	Southwest Region Magic Valley Region
Hayspur rainbow trout	Hayspur	3/97	184,506	135,520	1,125	73.50%	Clearwater Hatchery
Lahontan cutthroat trout	Omak	5/97	181,940	65,975	725	36.30%	Southwest Region Upper Snake Region
<b>Totals</b>			<b>1,199,506</b>	<b>817,288</b>	<b>18,371</b>	<b>68.25%</b>	

<sup>a</sup> This group was received as fry from Cabinet Gorge Hatchery.

<sup>b</sup> This group was received as fry from Hayspur Hatchery.

<sup>c</sup> This group includes 12,842 fry which were added to the original group from Hayspur Hatchery.

Appendix 4. Catchable production at Nampa Fish Hatchery, 1997.

<b>Species/ strain</b>	<b>Source</b>	<b>Date</b>	<b>Number received</b>	<b>Yield number</b>	<b>Yield pounds</b>	<b>% Survival egg to plant</b>	<b>Destination</b>
Kamloops trout	Troutlodge	9/95	<sup>a</sup> NA	10,563	5,315	NA	Southwest Region
Kamloops trout	Troutlodge	6/96-9/96	425,000	332,835	111,580	78.3%	Southwest Region
Kamloops trout	Troutlodge	6/96-8/96	349,697	270,396	76,105	77.3%	Transfer to Ashton Transfer to Sawtooth Transfer to Hayspur Transfer to Clearwater Transfer to McCall
rainbow trout	Mt Lassen	7/96	46,130	33,995	12,223	73.7%	Statewide Study
<b>Totals</b>			<b>820,827</b>	<b>647,789</b>	<b>205,223</b>	<b>77.6%</b>	

<sup>a</sup>Production fish carried over from 1996.

Appendix 5. Eyed-eggs received at Nampa Hatchery, January 1 to December 31, 1997.

Species/ strain	Date received	Source	Number	Destination	Expected yield	Cost/1,000 eggs
Colorado River rainbow trout	1/21/97	Hayspur	72,000	SW Reg, CFFH	46,800	N/C
Colorado River rainbow trout	1/28/97	Hayspur	80,475	SW Reg, US Reg	52,300	N/C
Colorado River rainbow trout	2/3/97	Hayspur	72,034	C Reg	46,800	N/C
rainbow trout	2/10/97	Hayspur	129,106	SW Reg, MV Reg	103,800	N/C
Kamloops trouta	2/10/97	Hayspur	26,320	SW Reg	21,000	N/C
rainbow trout	2/18/97	Hayspur	81,968	SW Reg	65,000	N/C
rainbow troutb	2/18/97	Hayspur	25,112	SW Reg	20,000	N/C
fall chinookc	2/19/97	Cabinet Gorge	22,240	P Reg, SW Reg	18,000	N/C
Kamloops trout	2/25/97	Hayspur	20,240	SW Reg	16,000	N/C
rainbow trout	3/3/97	Hayspur	184,506	C Reg	140,000	N/C
Lahontan cutthroat trout	5/7/96	Omak	281,940	SW Reg, US Reg	170,000	N/C
Kamloops trout	6/11/96	Troutlodge	239,620	SW Reg, HFH	192,000	\$16.00
rainbow trout	6/25/97	Mt. Lassen	16,660	Statewide	10,000	\$16.50
Kamloops trout	7/9/97	Troutlodge	213,517	SW Reg, HFH, MCFH, SFFH	170,000	\$16.00
rainbow trout (3n - triplids)	7/31/97	Mt. Lassen	19,485	Statewide	12,000	\$40.50
rainbow trout (control)	7/31/97	Mt. Lassen	17,112	Statewide	12,000	\$16.50
Kamloops trout	9/10/97	Troutlodge	234,765	SW Reg, SFH, CFH,HSFH	187,000	\$16.50
rainbow trout	10/6/97	Hayspur	10,000	MV Reg	7,500	N/C
rainbow trout	10/13/97	Hayspur	30,000	MV Reg	22,500	N/C
rainbow trout	10/27/97	Hayspur	43,000	MV Reg	35,000	N/C
brown trout	12/4/97	Saratoga	67,392	P Reg, SW Reg	43,500	N/C
Kamloops trout	12/27/97	Hayspur	82,733	SW Reg	65,600	N/C

<sup>a</sup> 12,842 fry from Hayspur Hatchery were added to this group.

<sup>b</sup> This group of rainbow were received from Hayspur Hatchery as fry.

<sup>c</sup> The fall chinook from Cabinet Gorge Hatchery were received as fry.

Destination Key	
Cearwater Region	C Reg
Clark Fork Fish Hatchery	CFFH
Clearwater Fish Hatchery	CFH
Hayspur Fish Hatchery	HSFH
Magic Valley Region	MV Reg
McCall Fish Hatchery	MCFH
Panhandle Region	P Reg
Southwest Region	SW Reg
Upper Snake Region	US Reg

Appendix 6. Nampa Hatchery feed costs, 1997.

<b>Supplier/Source</b>	<b>Size/Type</b>	<b># Boxes/Bags</b>	<b>Pounds</b>	<b>Price/lb</b>	<b>Feed charge</b>
<b>Biodiet</b>					
soft-moist	starter #1	11 boxes	484	1.28	\$629.20
soft-moist	starter #2	21 boxes	924	1.28	\$1,201.20
soft-moist	starter #3	26 boxes	1,144	1.43	\$1,487.20
soft-moist	1.0 mm	8 boxes	352	1.43	\$457.60
soft-moist	1.3 mm	15 boxes	660	1.06	\$702.00
soft-moist	1.5 mm	21 boxes	924	1.06	\$982.80
soft-moist	2.0 mm	90 boxes	3,960	1.06	\$3,690.00
Biodry 1000	1.0 mm	57 sacks	2,850	1.05	\$2,992.50
Biodry 1000	1.3 mm	93 sacks	4,650	0.75	\$3,487.50
Biodry 1000	1.5 mm	136 sacks	6,800	0.75	\$5,100.00
Steelhead 500	2.0 mm	125 sacks	6,250	0.57	\$3,396.00
Medicated TM	1.0mm	3 sacks	132	3.45	\$207.00
Medicated TM	2.0mm	10 sacks	440	3.45	\$690.00
		<b>Totals</b>	<b>29,570</b>		<b>\$25,023.00</b>
<b>Rangen</b>					
450 floating	1/16-in pellet	170 bags	8,500	0.47	\$3,995.00
450 floating	3/32-in pellet	25 bags	1,250	0.49	\$400.00
450 floating	1/8-in. pellet	85 bags	4,250	0.32	\$1,360.00
450 floating	5/32-in pellet	80 bags	4,000	0.51	\$1,280.00
450 floating	3/32-in pellet	bulk	24,770	0.31	\$7,851.70
450 floating	1/8-in pellet	bulk	97,660	0.32	\$31,251.12
450 floating	5/32-in.pellet	bulk	65,290	0.32	\$20,892.80
450 floating med	3/32-in pellet	34 bags	1,700	0.49	\$840.65
450 floating med	5/32-in pellet	60 bags	3,000	0.51	\$1,522.50
Dry	#2 medicated	3 bags	150	0.57	\$85.07
		<b>Totals</b>	<b>210,570</b>		<b>\$69,478.84</b>
<b>Grand Totals</b>			<b>240,140</b>		<b>\$94,501.84</b>

Appendix 7. Total net fish production at Nampa Fish Hatchery, 1994 through 1997.

Year	Put-and-Take		Put-grow-and-take		Total Number	Total Pounds	Feed		Feed Costs	Feed Conversion
	Number	Pounds	Number	Pounds			Pounds			
1994	308,023	146,978	793,065	55,014	1,101,088	201,992	220,544	\$72,340	1.09	
1995	567,147	193,309	783,722	42,336	1,350,869	235,645	261,589	\$76,793	1.11	
1996	694,659	212,011	950,412	34,271	1,645,071	246,282	262,902	\$91,893	1.07	
1997	556,718	188,208	693,859	19,006	1,250,577	207,214	240,140	\$94,502	1.12	

Appendix 8. Total cost of net fish production at Nampa Fish Hatchery, 1994 through 1997.

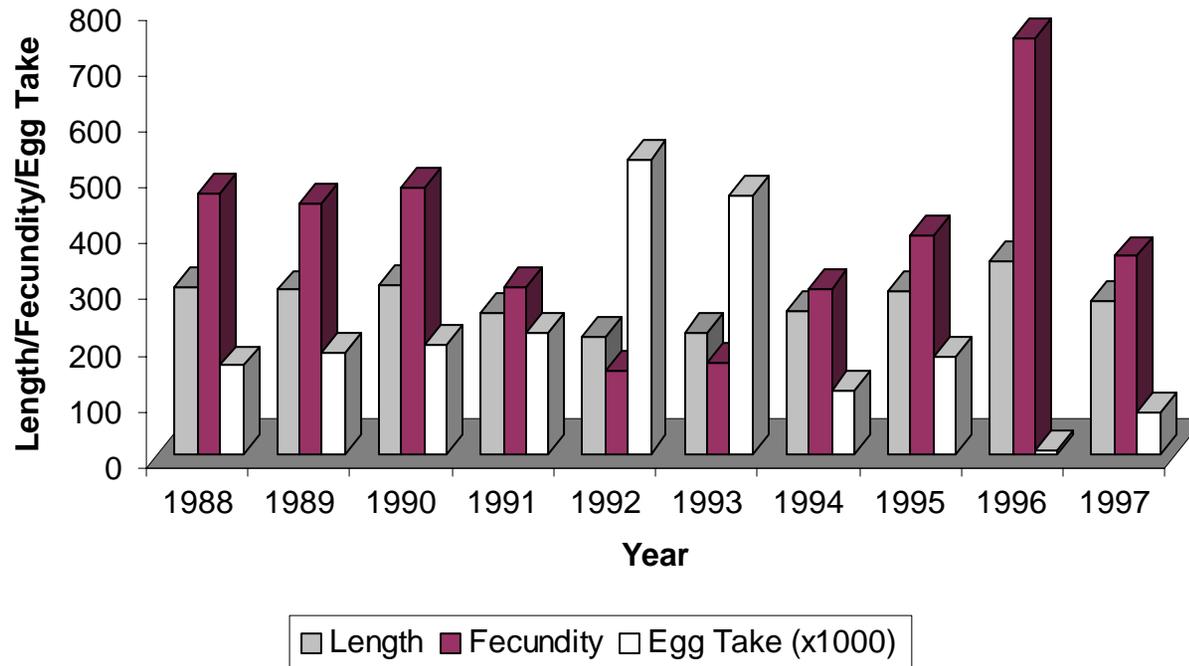
Year	Total cost through grow - out				Mean Length in inches	Total cost through stocking			
	Total Cost	Cost/1000 Fish	Cost/ Pound	Cost/ Inch		Total Cost	Cost/1000 Fish	Cost/ Pound	Cost/ Inch
1994	\$258,010	\$234.32	\$1.28	\$0.03	7.16	\$361,220	\$328.06	\$1.79	\$0.04
1995	\$271,156	\$200.77	\$1.15	\$0.03	6.98	\$376,266	\$278.54	\$1.60	\$0.05
1996	\$274,072	\$166.60	\$1.11	\$0.03	6.65	\$383,654	\$233.00	\$1.56	\$0.04
1997	\$308,979	\$247.07	\$1.49	\$0.04	6.85	\$406,743	\$325.24	\$1.96	\$0.06

Appendix 9. Kokanee egg take at Payette Lake, Nampa Fish Hatchery, 1996.

Lot Number	Spawn date	Female spawned	Green eggs	Eyed Eggs	% eye-up
1	9/11/97	580	192,000	NA	NA
2	9/15/97	1,212	401,000	NA	NA
3	9/24/97	300	143,737	NA	NA
<b>Totals</b>		<b>2,092</b>	<b>736,737</b>	<b>581,677</b>	<b>78.9%</b>

Appendix 10. Kokanee spawning length, fecundity, egg take (x1000), Nampa Fish Hatchery, 1988 – 1997.

### Kokanee Spawning Spawning Summary (1988-1997)



**IDAHO DEPARTMENT OF FISH AND GAME**

**ANNUAL REPORT**

**SANDPOINT FISH HATCHERY**

**1997**

**John R. Thorpe  
Fish Hatchery Manager II**

## INTRODUCTION

The Sandpoint Fish Hatchery (SFH) is located in Bonner County on the south shoreline of the Pend Oreille River about two miles south of the town of Sandpoint. A limited water supply restricted production, resulting in high fish production costs. Public relations with local sportsmen's groups (Bonner County Sportsmen's Association, Trout Unlimited, and Lake Pend Oreille Idaho Club) are major benefits to the station. Duties include managing a small-scale specialty station rearing rainbow trout *Oncorhynchus mykiss*, westslope cutthroat trout *O. clarki lewisi*, chinook salmon *O. tshawytscha*, kokanee salmon *O. nerka kennerlyi*, and Kootenai white sturgeon *Acipenser transmontanus*; managing a net pen rearing program; and operating or helping in north Idaho egg-taking programs.

The staffing at the SFH consisted of the Fish Hatchery Manager II from the Clark Fork Fish Hatchery. Although, the SFH was closed in 1985, it was reopened in 1990 in response to public demand in the Panhandle Region. The SFH is license-funded, with \$13,500.00 allocated for operation in FY97.

### Water Supply

The SFH water supply consists of 500 to 600 gallons per minute (gpm) at 7°C from Murphy Spring #3. Springs #1, #2, and #4 have not been developed for SFH use; although their discharge is included in the four cubic feet per second (cfs) water right. The SFH flow fluctuates seasonally, with lowest flows in late summer and highest flows in early spring.

The Idaho Department of Fish and Game (Department) was deeded the springs in 1928. However, this deed did not include property ownership of the surrounding land. The easement agreement states that the Department will provide a two-inch domestic line to the landowners in exchange for a collection reservoir and pipeline right-of-way from the springs to the SFH.

The water right to spring #2 has been waived to the South Side Sewer District in the amount of 300 gpm. This water may be reclaimed for SFH use if needed.

### Rearing Facilities

The SFH rearing facilities include 8 Heath incubators (8-tray), 18 cement vats (15 ft x 2.5 ft x 3 ft) inside the SFH building, and 2 outdoor concrete raceways (100 ft x 5 ft x 2 ft). Two vats have been modified with heaters and recirculation pumps for warm water rearing. The carrying capacity of the SFH ranges from 880 pounds (2.5 million) of on1-inch fish to 12,800 pounds (25,500) of 10-inch fish.

Off-site SFH rearing facilities include 8 net pen frames and 11 net pens (20 ft x 20 ft x 20 ft) with assorted mesh sizes ranging from 1/4-inch to 1 1/4-inch. A carrying capacity for net pens has not been established, but limiting capacity to 1,000 pounds per pen has shown good results.

The SFH buildings consist of one nursery/shop/office complex, one storage shed, garage/crew quarters, and a residence. A regional shed provides covered storage.

### **Hatchery Improvements**

The SFH improvements during 1997 included:

- Installation of overhead lighting and a 220 volt receptacle in the two stall garage.

Needed SFH improvements include:

- A new water collection system at spring #3 to collect the water now bypassing the spring box.
- Improved weatherization, as well as an alternative heating system, in the SFH building. The present electric heating cost averages \$600 to \$800/month. That level of heating does not provide a comfortable working environment, it only slows the ice formation on the walls and floors.
- A drainage system to carry ground water away from the walls of the residence. The basement stays damp most of the year, and has water flowing across the floor during spring thaw.

### **HATCHERY OPERATIONS**

Since the loss of the only water supply line to the SFH on December 31,1996 there has been no production at the SFH. Numerous problems in accomplishing the repairs have prevented reopening the site in 1997.

The SFH continues to serve as a primary administrative office for the Clark Fork, Mullan, and Sandpoint hatcheries manager. The north District Conservation Officers maintain an equipment storage garage at the SFH.



**IDAHO DEPARTMENT OF FISH AND GAME**

**ANNUAL REPORT**

**SAWTOOTH FISH HATCHERY**

**1997**

**Roger Elmore  
Fish Culturist**

## INTRODUCTION

Sawtooth Fish Hatchery (STFH) is a U.S. Fish and Wildlife Service Lower Snake River Compensation Plan (LSRCP) hatchery and has been in operation since 1985. The Idaho Department of Fish and Game (Department) operate this facility. The primary goal of the STFH is to trap, spawn, raise, and release spring chinook salmon *Oncorhynchus tshawytscha*. Also, adult steelhead are trapped and spawned with the eyed eggs and fry being sent to other hatcheries for hatching and growout. In 1990, a program to stock rainbow trout *Oncorhynchus mykiss* into the surrounding area waters for improved angling opportunities began. In 1997, STFH personnel assisted by Salmon Region fisheries biologists stocked high mountain lakes with rainbow trout, westslope cutthroat trout *Oncorhynchus clarki lewisi*, and Arctic grayling *Thymallus arcticus*. All high mountain lakes were stocked with fry.

## FISH STOCKING

Nampa Fish Hatchery supplied STFH with 71,245 rainbow trout (K1 strain) for stocking. Mackay Fish Hatchery provided 3,100 Hayspur strain rainbow trout for stocking into Pettit Lake. In exchange for the 3,100 fish provided by Mackay Fish Hatchery, STFH planted an equal amount of fish into several ponds in the Salmon area normally planted by Mackay. Grace Fish Hatchery provided 12,000 Hayspur strain rainbow trout for stocking into Alturas Lake. In return for the 12,000 Hayspur strain rainbow trout provided by Grace Fish Hatchery, Nampa Fish Hatchery replaced them with 12,000 K1 rainbows. The total number of fish received at STFH was 86,345 and a total of 80,995 fish were stocked. The majority of fish, totaling 39,150, were stocked into the main Salmon River (Appendix 1). National Marine Fisheries Service permit #908, which allows the river to be stocked, does not allow fish greater than 250mm in length to be stocked into the Salmon River, Valley Creek, and the Yankee Fork Ponds.

Fishing regulations are in place to protect wild trout in the upper Salmon River by imposing a 14-inch (in) minimum size restriction on wild trout. To be able to discern wild trout from the stocked STFH trout, all STFH trout stocked into the Salmon River, Valley Creek and the Yankee Fork Ponds had their adipose fins clipped. The STFH assisted by Salmon Regional fisheries staff clipped 24,150 fish at STFH. A total of 66 man-hours were required to clip these fish. Another 25,425 rainbow were clipped at Nampa by Nampa Fish Hatchery staff, time required approximately 65 man-hours, before delivery to Sawtooth. After clipping, fish were retained at the STFH for 21 days before stocking. This is the amount of time required to allow for withdrawal of MS-222, used to anaesthetize the fish, so the fish would be safe for human consumption.

Fish feed was purchased from Nelson's Silver Cup and Rangens. A total of 7,700 pounds of 1/8" size pellets were fed throughout the course of the summer. Total cost of fish feed was \$2,117.50. Tourists purchased \$700.00 of feed through the coin feeders to help offset the feed cost.

Pettit Lake received 3,000 Hayspur strain rainbow trout that were left ventral clipped and stocked into Pettit Lake. The purpose for this is to try and determine how many fish survive over winter and what impacts, primarily predation, they may have on young sockeye salmon. A different type of a mark will be applied to the fish being stocked in 1998 and in future years to be able to differentiate year classes. Creel census data estimate that 75% of these fish were caught (Jay Pravecek, personal communication).

Weekly notices informing the public of the whereabouts of the latest stocking locations are distributed to local businesses and are posted at the STFH. Also, a repeating message can be heard over the local radio transmitter containing stocking information and current news about STFH. Stocking information is available by dialing the 1-800 Ask Fish phone number.

During 1996 a brochure called Fishing Sawtooth Valley was produced. This year the brochure was improved, with more color pictures of fish available in the area, as well as suggested locations to catch fish. A short narrative describing the plight of anadromous fish is included. The entire back of the brochure has a map indicating where STFH stocks fish. Funding for the cost of printing was provided by a grant from Bonneville Power Administration. A total of 4,000 brochures were printed and almost all were distributed in 1997. This brochure proved very popular and informative.

Once again STFH sponsored a Kid's Fishing Day at the Sawtooth Display Pond on Free Fishing and Camping Day, June 7, 1997. The turnout was great with 76 children participating. The weather was good and the fishing was great; every one caught a fish. Fishing poles, bait and lures were provided by the Department Information and Education Bureau. Drinks and snacks were provided by the STFH. Shelley Cooke, Sawtooth FH Visitor Information Specialist Bio-Aide, put together the successful program. Other Department employees helping out were Gary Gadwa and Paul Valcarce, Stanley, Conservation Officer's; Devin Cecil, Bio Aide; Sylvia Hamilton, Eagle Fish Hatchery Fishery Technician; Ken Hartz, Department Reservist; and Brent Snider, STFH Manager. Other area helpers included Greg Cooke, volunteer; Robert Griswold, Biolines Environmental Consulting, Scot Dye and Doug McFall, Idaho State Police, and Chris Cullen, Custer County Deputy Sheriff.

### **MOUNTAIN LAKE STOCKING**

The STFH personnel stocked high mountain lakes in the Salmon Region with fixed-wing aircraft or by hiking/horse-packing volunteers. A total of 129 lakes were stocked with 80,400 fish. Ninety-seven mountain lakes were stocked out of the Sawtooth Hatchery at a cost of \$1,837.50 or \$18.97 per lake. McCall Fish Hatchery flew 11 lakes and volunteers stocked 21 lakes donating an estimated 125 hours of time to the department. Resident budgets at McCall and Sawtooth were charged for flight and personnel time for this program. The fish species stocked into the high mountain lakes were cutthroat trout, rainbow trout, and arctic grayling. McCall Fish Hatchery stocked all of the rainbow trout totaling 7,750 fish. Washoe Park Fish Hatchery in Montana supplied westslope cutthroat trout and they performed very poorly. A total of 207,500 eyed eggs were received with 56,100 dead being picked off for a fry ponding number of 151,400 (73% swim-up). These fry did not go on feed very well. A total of 67,500 were eventually stocked which meant the mortality rate was 64%. Grayling were supplied by Ashton Fish Hatchery and performed well at the STFH. A total of 5,150 grayling were stocked.

## **PLANS FOR 1998**

In 1997 NMFS Permit #908 was modified to change the way the Yankee Fork Ponds are stocked. There are four series of ponds. A decision was made to not stock pond series 2 at all and to not stock pond series 1 before June 15. The permit may be modified to require all Stanley Basin area waters that are stocked to restrict size at stocking to an average total length of no more than 250mm.

The request numbers for Alturas Lake has been reduced from 15,000 per year to 12,000 per year.

Mountain Lake stocking should be the same, except that a source for better performing cutthroat needs to be found.

A pond of about one acre in size was constructed approximately one half mile upstream of where Squaw Creek enters the Salmon River. This was a cooperative effort between the Department and Thompson Creek Mining Company. The purpose of the pond is to be used as a steelhead smolt acclimation and volitional release pond in the spring and as a fishing pond during the summer months.

Plans are to participate in Free Fishing Day again.

## **ACKNOWLEDGEMENTS**

The STFH would like to thank Rick Alsager and the Nampa Hatchery crew for their cooperation in making 1997 successful. Special thanks go to Dick Bittick and Gary Ady for transporting fish from Nampa and Grace. Paul Valcarce was responsible for improving the already popular Fishing Sawtooth Valley brochure.

Jay Pravecek, Tom Curet, and his crew provided valuable assistance clipping adipose fins. Lyle Leslie kept anglers busy by stocking most of the fish.

Steve Kammeyer, Gary Gadwa, Mark Liter, and Mel Sadecki contributed to the success of Mountain Lake stocking.

Appendix 1. Planting sites and numbers of catchable rainbow trout stocked in the Salmon Region by Sawtooth Fish Hatchery during May through September 1997.

<b>Site</b>	<b>Number</b>
Salmon River *	39,150
Valley Creek *	4,000
Perkins Lake	2,000
Pettit Lake *	3,000
Grouse Lake	100
Yankee Fork Ponds *	4,000
Little Bayhorse Lake	2,000
Hayden Creek Pond	800
Hyde Pond	600
Anderson Pond	595
Kids Creek Pond	910
Stanley Lake	13,500
Alturas Lake	9,300
Quake Lake	140
Kelly Creek Pond	900
<b>Totals</b>	<b>80,995</b>

\* Places and numbers of fish stocked under Permit #908 guidelines.  
Permit limit is 51,500; total of 50,150 stocked.



**IDAHO DEPARTMENT OF FISH AND GAME**

**RESIDENT HATCHERIES**

**FISH HEALTH REPORT**

**1997**

**Douglas R. Burton  
Fishery Pathologist**

## INTRODUCTION

The Resident Hatchery Pathologist's primary duties are to provide fish health inspection and diagnostic services to the Idaho Department of Fish and Game's (Department) resident fish hatcheries. These same services are provided to Department fishery managers and biologists around the state. Occasionally this service is provided to individuals or companies where the information or relationship is of benefit to the Department. The Resident Hatchery Pathologist, Douglas R. Burton, works closely with, the Anadromous Hatchery Pathologist, A. Douglas Munson, assisting each other in their programs.

The Resident Hatchery Pathologist (RHP) is a monitor for the Western Regional Investigational New Animal Drug (INAD) program, which allows for the limited use of certain drugs and chemicals which are not currently labeled for use on food fish. Douglas R. Burton completed the requirements and was certified this year by the American Fisheries Society as a Fish Health Inspector.

The RHP examined 93 cases for Department resident hatcheries during 1997; 63 routine inspections (including 20 inspections of feral brood stock) and 30 diagnostic cases. The RHP also handled 6 wild fish survey inspections, 7 research cases, and 3 inspections for private individuals. A summary of the work at each Department hatchery, as well as the results of all sampling done at the hatcheries, are as follows.

## AMERICAN FALLS

Fish at American Falls were inspected twice, in February and December (Appendix A). No pathogens were detected in either inspection. Changes in the management strategy at American Falls have resulted in significantly improved fish health at the hatchery. *Flexibacteriosis/flavobacteriosis* (coldwater disease) has historically been the single most serious disease problem at American Falls Fish Hatchery since reconstruction in the 1980s. Oxytetracycline in medicated feed was used extensively in the past, leading to the development of an endemic strain of *Flavobacter psychrophilum* (formerly *Flexibacter psychrophilus*) which was beginning to show signs of resistance to the drug. Response was good when the drug was used at a higher dosage rate and for a longer period, as allowed by INAD #9333 protocols. However, there is no certainty that this higher dosage will ultimately be approved for general use or that the INAD protocols will continue to be available. Therefore, another approach to deal with the disease is very desirable. Modified rearing techniques were initiated where rainbow trout fry were ponded in the outside raceways instead of in the indoor vats, avoiding the need to handle and stress the fish at a size where they seem the most susceptible to disease. Loading densities were significantly lowered. As a result, very few signs of disease were observed, and no epizootics requiring drug treatment were experienced in 1997. The hatchery staff deserves commendation for their excellent work! They must remember, this is a problem, which will certainly return if their vigilance is ever relaxed.

## ASHTON HATCHERY

No samples of fish were taken from the production fish at Ashton during 1997, although the facility was visited and visually inspected twice. Hatchery personnel reported outbreaks of *Gyrodactylus* that were routinely treated with flushes of formalin. This is a historically recurring problem at this facility, and will continue as long as there remains open water between the springs and the hatchery intake. With the increasing number of waters in the vicinity, which are being found to contain *Myxobolus cerebralis*, the possibility that this parasite could enter the hatchery is a very real concern. Ashton personnel were closely involved with the spawning operations at Henrys Lake Fish Hatchery, and actually took most of the ovarian fluid samples tested from cutthroat and brook trout brood-stocks. Results of those tests are reported in the Henrys Lake Fish Hatchery section.

## CABINET GORGE HATCHERY

Health of the kokanee fry and fingerling was reportedly very good this year. The RHP visited the hatchery in May and visually inspected the raceways, but chose not to sample any fish at that time due to their very small size. Improvements in incubation and early rearing techniques have prevented any outbreaks of bacterial gill disease at this facility for the last two years. For this, the hatchery personnel deserve to be commended. No clinical Bacterial Kidney Disease (BKD) has been reported on this hatchery since the discontinuation of the captive brood stock program in 1994.

The spawning kokanee at Sullivan Springs were sampled in December (Appendix B). Condition of the fish appeared very good, with a somewhat lower observed occurrence of internal parasites (encysted cestodes or nematodes in the swim bladder) than in past years. Samples were negative for replicating viruses, and no spores of *M. cerebralis* or *C. shasta* were detected. *Renibacterium* antigen was detected in 6 of 12 pooled samples by Enzyme-Linked Immunosorbent Assay (ELISA), although no bacteria were detected by Fluorescent Antibody Test (FAT). This finding is consistent with previous years. The prevalence is higher than in the past, although it would be premature to report this as a trend.

## CLEARWATER HATCHERY

The Anadromous Fishery Pathologist, Doug Munson, is responsible for most of the inspection work at Clearwater Fish Hatchery (CFH). He performed one diagnostic examination of the resident Kamloops trout and several visual inspections during his routine visits to the facility (Appendix D). The RFP made one inspection visit to the hatchery, checking two populations of rainbow trout. A heavy infection by *Pseudomonas aureofaciens* was Mr. Munson's diagnosis from the Kamloops, while no pathogens were detected in the inspections of the Hayspur and Ennis rainbow trout.

The CFH's resident trout production is important to fishing quality in the Clearwater Region. In addition, CFH can stock healthy rainbow trout in Dworshak Reservoir, (the hatchery's own water source), instead of relying on fish from other hatcheries which may or may not carry unwanted pathogens. However, the program is secondary to the CFH's primary goal of rearing anadromous fish species. Care must be given to keep the two programs as isolated as possible to avoid the transmission of pathogens.

## GRACE HATCHERY

Three diagnostic cases were examined at Grace Fish Hatchery in 1997, all involving Hayspur-strain rainbow trout (Appendix E). The first episode involved a concomitant heavy infection by *Aeromonas hydrophila*, the causative agent of Motile Aeromonad Septicemia (MAS), with a light infection of *F. psychrophilum*. Over-loading of the small raceways was a precursor to the situation. Thinning and Oxytetracycline (OTC)-medicated feed treatment were fairly successful in alleviating losses. The second episode was diagnosed as Cold Water Disease (CWD), (*F. psychrophilum* isolated from 8 of 8 fish) and required use of an INAD protocol to treat with OTC. Results were not as good as hoped, so the same lot of fish were examined a second time. Only a few *Flavobacter* spp. and *Pseudomonas fluorescens* colonies were found in the follow-up. No further treatment was applied.

## HAGERMAN HATCHERY

At Hagerman Fish Hatchery 7 inspection and 9 diagnostic cases were examined in 1997 (Appendix F). Significantly better survival of swim-up rainbow fry was achieved this year by eliminating the belt feeders in the vat building and returning to hand-feeding until the fish are well established in their feeding behaviors. Better utilization of feed resulted in improved nutrition for the fish and less waste material to degrade environmental conditions.

Losses in the outside raceways were attributed to infectious Hematopoietic Necrosis Virus (IHN) -virus, bacterial infections or combinations thereof. The hatchery personnel, without calling on the Eagle Fish Health Laboratory (Lab) for diagnostic confirmation, observed several IHN episodes. The bright side to this situation is that the overall percentage of loss in these groups was down for the year. This is possibly due to a combination of the completion of bird netting over the large raceways, reconstruction of the Tucker Springs portion of the large raceway headrace, and management efforts to grow the fish larger in the small raceways. The worst losses came during spring and early summer, when Hayspur-strain rainbow trout were loaded the heaviest and were moved to the large raceways at smaller size.

Only two lots of fish were treated for CWD under INAD 9332 protocols. Success of the OTC-treatments was moderated by subsequent episodes of IHN virus. This is another situation where occurrence of disease is strongly related to both size and stress conditions, (see American Falls Fish Hatchery, above). Unfortunately, production demands and pathogen load may make changes in hatchery management less effective. *Aeromonas hydrophila* and *Pseudomonas fluorescens* were the other significant bacterial pathogens isolated. These species of bacteria are facultative organisms, which may be both primary causes of disease, or secondary opportunists when a host is compromised for another reason.

## HAYSPUR HATCHERY

For the second consecutive year, there were no production fish reared at Hayspur Fish Hatchery (HSFH), thus, there were no significant disease problems. The RHP's work at HSFH involved considerable effort to inspect brood stock and brood stock replacement lots, and to inject the female brood stock with OTC or Penicillin-G. This meant that the RHP worked more closely with the HSFH personnel than with those of any other hatchery. The RHP expresses appreciation to Bob Esselman, Doug Young, and Paul Dorman for their efforts in assisting his work and making it most enjoyable.

The brood year 1995 replacement brood stock of Hayspur-strain rainbow and Kamloops, and the brood year 1996 Colorado River rainbow trout were inspected in April. No viruses, *Myxobolus* spores, *Nucleospora* inclusions, or significant bacteria were detected. It was disappointing, in light of the effort and expense invested in sampling and culling, to find that both populations of Hayspur-strain fish tested positive for *Renibacterium* antigen by ELISA (Appendix G, Accessions 97-087 and 97-088). These fish were all held on spring/well water at HSFH, but in the small raceways, which are in very close proximity to the open pond. The fish were subject to predation by otters or mink, which easily penetrated the lightweight bird net over the raceways. Investment in some type of solid predator enclosure around these raceways would greatly benefit the program if replacement brood stocks are to be kept at HSFH.

Intensive sampling and culling of the replacement brood stock pairings continued to be the health priority at HSFH. Ovarian fluids were collected from every female for virology and FAT analysis. Membrane-Filtration Fluorescent Antibody Test (MFAT) analysis was performed on the Colorado River rainbow population (spawned December 1996 through February 1997). This test was not performed during the fall spawning season due to budgetary constraints. In addition, 60 females from each population were sacrificed for ELISA. Eggs from individual females were held in isolation until the test results were available. Groups of eggs analyzed by FAT or MFAT were culled if the parent female tested positive for any virus or for *Renibacterium*. The culling criterion for ELISA was set at an optical density (OD)  $\geq 0.110$ , but the hatchery manager was given the option of culling any positive fish at his discretion. Female brood fish from the Hayspur-strain populations were given injections of Oxytetracycline, Penicillin-G, or in the case of one pond of Kamloops, none at all (an inadvertent control group which was supposed to be on delayed light control, but in which spawning was not delayed). The purpose of the injections was to inhibit transmission of *F. psychrophilum*, but there may have been some additional benefit in lowering the levels of *Renibacterium*. Penicillin-G was tried for the first time this year in an attempt to find a drug therapy which is effective in reducing carrier states of *F. psychrophilum*, to which the bacteria have less propensity to develop resistance. The brood fish at HSFH are a contained population and no injected fish will ever be used for human consumption.

### Colorado River Rainbow Trout

The 1997 spawning season, January-February was the second replacement brood stock spawning of the Colorado River-strain rainbow trout population at HSFH. There were three age classes of mature brood fish at HSFH for the 1997 season, all of which were reared at Ashton Fish Hatchery before being transferred to HSFH. All of these fish were held in one round pond, with differential adipose fin (AD) clips, and so were treated as a single population for disease sampling. Two hundred females were tested using ovarian fluids for MFAT and virology, and 60 of those females were sacrificed for ELISA and FAT. No viruses were detected in the

population. A total of 8 females tested positive for *Renibacterium salmoninarum* (RS), 5 by ELISA only, one by MFAT only, and 2 by both tests. The eggs from five of these fish were culled.

### **Hayspur Rainbow**

The Hayspur-strain rainbow brood stock replacement spawning began on October 9 and ended December 17. Ovarian fluids from 200 females were tested for viruses and *Renibacterium* by FAT. Sixty of those 200 females were sacrificed for ELISA. No viruses were detected from any fish, nor was any RS detected in ovarian fluids by FAT. Eight of 60 fish (13.3%) tested positive for RS by ELISA. Eggs from 4 of those fish were culled. Detection of RS by ELISA was up slightly from the previous year (6 of 60 or 10.0%) but total detection was down (10 fish out of 200 in 1996). The difference was that an addition 4 positive fish were detected by MFAT in 1996.

An attempt was made to determine the carrier state of *F. psychrophilum* in this brood stock population by inoculating ovarian fluid from spawning females on specific agar medium. Twenty fish from the first spawning day and 20 more from the third spawn day were inoculated. One fish from the first day was positive at a very low level, (two colonies of *F. psychrophilum*), but none were detected from any fish from the second sample day. This gives us some indication that the pre-spawning injection of OTC was not 100% effective, but there were no controls available to give an indication of what the prevalence might have been without the injection. This suggests a line of research, which should be followed up in the next year.

### **Hayspur Kamloops**

Kamloops spawning at Hayspur overlaps the end of the calendar year. The results of the 1996-97 season, (Dec. 10, 1996 through Feb. 19, 1997), were reported in the 1996 Resident Hatchery Annual Report. In brief summary, no viruses were detected in the population, and 7.0% (9 fish) were positive for RS by ELISA, MFAT, or both.

The 1997-98 Kamloops spawning is not complete at the time of this writing, so only the 1997 portion will be reported. At the end of the calendar year, three egg-takes had been done for brood stock replacement. A total of 88 females had been sampled with no viruses detected and no RS positives detected by FAT on ovarian fluids. The ELISA had found one fish out of 30 positive for RS antigen at an optical density of 0.107, which was below the culling criteria.

## **HENRYS LAKE HATCHERY**

Disease inspection samples were taken from spawning cutthroat trout at Henrys Lake Fish Hatchery from March 11 through May 7, 1997 (Appendix H). Gametes were collected at Henrys Lake and transported to Ashton Fish Hatchery for delayed fertilization. Ovarian fluids were collected by hatchery personnel at Ashton and shipped to the Lab where they were tested for viruses (350 females in 50 seven-fish pools) and RS (1960 females in 230 seven-fish pools and 70 five-fish pools). A group of 60 fish (both males and females) were sacrificed for ELISA, kidney FAT, virology, and *Myxobolus* tests. All tests were negative for viruses (both tissues and ovarian fluid). *Renibacterium salmoninarum* was detected by FAT in 2 ovarian pools and by ELISA in 7 of 12-pooled kidney samples (all lows). Eggs from the FAT-positive pools were

discarded. Bacteriology samples taken from 2 of 12 fish showed low-level infections of *Pseudomonas aerofaciens*. No *Myxobolus* spores were detected in this sample by the digestion method, although this population was confirmed positive for *M. cerebralis* in 1996.

Similar samples were taken from spawning brook trout in October and November. A total of 80 pooled ovarian fluid samples were tested (245 fish for viruses and for 398 RS). No pathogens were detected from ovarian samples. In addition, a group of 60 (males and females) were sacrificed for ELISA, FAT, *Myxobolus*, bacteriology, and virology tests. All fish tested were negative for viruses. ELISA results indicated RS positives from 2 of 12 five-fish pools, both lows. Carrier states of *F. psychrophilum* and *F. odoratum* were detected by bacteriology. For the third year in a row, *Myxobolus* spores were detected by the digestion method from of pooled samples. For the first time, histology was able to confirm the species as *M. cerebralis*, the causative agent of whirling disease.

### **KOOTENAI HATCHERY**

Fish health at Kootenai Fish Hatchery was reportedly excellent in 1997. No out-breaks of bacterial gill disease or any other disease in the Kootenai River sturgeon were reported, therefore, no one from the Eagle Fish Health Lab (Lab) visited the facility this year. The Department's contract with the Kootenai Tribe to operate this facility ran out at the end of June.

### **MACKAY HATCHERY**

Mackay Fish Hatchery was visited once in 1997 (Appendix I). Inspection samples were taken from five populations of fish, (2 groups of brown trout, 2 groups of kokanee salmon, and 1 group of cutthroat trout). Tests included virology, bacteriology, ELISA or FAT for RS, and WHD. No reportable pathogens were detected from any population, although a carrier state of *A. hydrophila* was detected in the Saratoga-strain brown trout. This is a facultative bacterium, which may become a primary pathogen, or may cause no clinical disease at all, depending upon the unique conditions within a given fish population. No production fish at Mackay have ever tested positive for *M. cerebralis*, but the parasite has been found in fish from the settling pond. This proximity to the production raceways must cause some doubt if the hatchery is truly free of the parasite, although the prevalence and levels of infection may never be high enough to detect.

Early-spawning kokanee were sampled at a new trap site above Payette Lake. Nampa Fish Hatchery provided the personnel to operate the trap, but green eggs were shipped directly to Mackay Fish Hatchery, therefore the results are reported in the Mackay Summary (Appendix I). This was the first opportunity to inspect this spawning population, so 2 sets of samples were taken, totaling 150 fish. A high prevalence of RS was detected by ELISA (25 of 29 five-fish pools, or 86%), but no signs of clinical BKD were seen. All optical densities were low. This prevalence was higher than had been detected in the past from the Deadwood Reservoir population of early kokanee, (1996-42%, 1995-10%). The levels of RS antigen (optical densities) detected in the Payette Lake fish were actually less than some of the levels that have been detected from Deadwood fish; therefore, the probability of seeing disease in progeny from Payette Lake fish is likely no greater than in those originating from Deadwood Reservoir. The significance of this finding may be greater in relation to McCall Fish Hatchery, from whose water source these fish were sampled. No other pathogens were detected.

## **MCCALL HATCHERY RESIDENT PROGRAM**

The spawning westslope cutthroat trout at Fish Lake were sampled on May 9 (Appendix J). The run was small this year, so only 20 males were sacrificed for ELISA, kidney FAT, VIRO and parasitology (WHD and *C. shasta*). Ovarian fluids from 51 females were collected and used for virology in addition to the tissue samples. All 71 fish tested negative for replicating viruses. All 20 FAT samples were negative for *Renibacterium*, but 14 of 20 ELISA samples (70%) were positive (13 lows, and 1 high). The prevalence of RS in this population has remained fairly constant during five years of sampling by ELISA (1993-87%, 1994-90%, 1995-90%, 1996-80%). No clinical signs of BKD have been observed in any inspection. It is uncertain what, if any, direct impact that RS is having on this population. However, this should certainly raise some concern about where progeny of this population are stocked. No *Myxobolus* or *C. shasta* spores were detected in samples from this population.

An inspection was done on the BY96 westslope cutthroat in the hatchery, prior to their return to Fish Lake. No pathogens, (viruses, RS, or bacteria) were detected.

## **NAMPA HATCHERY**

The total number of cases (11) examined at Nampa was exactly the same in 1997 as in the previous year. Flavobacteriosis (*F. psychrophilum*) and MAS (primarily *A. hydrophila*) continued to be the two most common diseases diagnosed in rainbow trout, while a number of bacteria were found in the brown trout which may have not been definite cause of disease (Appendix K). Not all episodes were severe enough to warrant treatment. Oxytetracycline was used, either under INAD or existing label approval, when losses became unacceptable. Response to such treatment was generally good.

Contact has been maintained with toxicology experts at Wright State University to help identify the mystery "blue-green" algae which sometimes causes losses at Nampa Fish Hatchery. However, this syndrome has not been seen since 1995, when that contact was first made. We will follow up on this if, or when, the problem occurs again.

## **SANDPOINT HATCHERY**

No fish were reared at Sandpoint during 1997 because of the pipeline collapse, which occurred December 31, 1996.

## **ACKNOWLEDGMENTS**

Douglas R. Burton, Resident Health Pathologist, with much gratitude acknowledges his supervisor, Keith Johnson, and Doug Munson, his anadromous counterpart, for their assistance in the field and for sharing their considerable knowledge with him. The efforts of the Lab Technologists Sharon Wavra, Roberta Scott, Carla Hogge, and Erica Harrold, are greatly appreciated. Their timely and accurate results from the laboratory are essential in diagnosing and treating fish health problems in the field. Dorothy Baker's ability to organize the masses of information and paperwork is a very important contribution to the Lab team. Finally, He wishes to acknowledge the Hatchery Managers and personnel with whom He worked. Their cooperation is greatly appreciated, and He sincerely hopes He has been able to benefit their programs.

Appendix A. Summary report of Eagle Fish Health Laboratory results for American Falls Hatchery, January 1 – December 31, 1997.

Brood year	Stock	Species	Accession	IHN	IPN	EIBS	BKD	FUR	ERM	CWD	PKD	WHD	CSH	ICH	GBD	Diagnoses
1996	Hayspur	Rainbow trout	97-021	-	-			-	-	-						IX: NPD; VIRO 0/60, BACTE-NSG
1997	Trout Lodge	Rainbow trout	97-323	-	-		-	-	-	-						IX: NPD; VIRO 0/60, FAT 0/60, BACTE-NSG

Appendix B. Summary report of Eagle Fish Health Laboratory results for Cabinet Gorge Hatchery, January 1 – December 31, 1997.

Brood year	Stock	Species	Accession	IHN	IPN	EIBS	BKD	FUR	ERM	CWD	PKD	WHD	CSH	ICH	GBD	Diagnoses
Brood	Sullivan Springs	Kokanee salmon	97-464	-	-		+					-	-			IX: RS; VIRO 0/60, FAT 0/60, ELISA 6/12 (all low), CSH 0/20, WHD 0/60

## Appendix C. Summary report of Eagle Fish Health Laboratory results for Clark Fork Hatchery, January 1 – December 31, 1997.

Brood year	Stock	Species	Accession	IHN	IPN	EIBS	BKD	FUR	ERM	CWD	PKD	WHD	CSH	ICH	GBD	Diagnoses
1996	Trout Lodge	Kamloops trout	97-095	-	-			-	-	-						DX: NPD; VIRO 0/10 BACTE-NSG
1993	Clark Fork (Brood)	Cutthroat trout	97-172	-	-		+					-				IX: RS; VIRO 0/60, ELISA 3/10 (2-fish pools; 2 low, 1 high), WHD 0/20, <i>Nucleospora</i> 0/8
1996	Trout Lodge	Kamloops trout	97-173	-	-			-	-	+						DX: CWD, <i>Pseudomonas</i> ; <i>F. psychrophilum</i> 3/4 <i>P. chlororaphis</i> 3/4, <i>Pseudomonas</i> spp. 2/4
1996	Henry's Lake	Brook trout	97-174	-	-											DX: NPD; VIRO 0/10
1996	Hayspur	Kamloops trout	97-175	-	-			-	-	-						DX: NPD; VIRO 0/5 BACTE-NSG
1996	Clark Fork	Cutthroat trout	97-176	-	-			-	-	+						DX: CWD; VIRO 0/5, <i>F. psychrophilum</i> 4/4
1996	Clark Fork	Cutthroat trout	97-465	-	-			-	-	+						DX: CWD, <i>Pseudomonas</i> ; VIRO 0/8, <i>F. psychrophilum</i> 1/8 <i>P. maltophila</i> 3/8 <i>P. aurofaciens</i> 1/8, <i>Pseudomonas</i> spp. 3/8

Appendix D. Summary report of Eagle Fish Health Laboratory results for Clearwater Hatchery Resident Trout Program, January 1 – December 31, 1997.

Brood year	Stock	Species	Accession	IHN	IPN	EIBS	BKD	FUR	ERM	CWD	PKD	WHD	CSH	ICH	GBD	Diagnoses
1997	Hayspur	Rainbow trout	97-193*	-	-			-	-	-						DX: <i>Pseudomonas</i> ; VIRO 0/5, <i>P. aureofaciens</i> 4/4
1997	Ennis	Rainbow trout	97-387	-	-			-	-	-						IX: NPD; VIRO 0/10, BACTE-NSG
1997	Hayspur	Rainbow trout	97-388	-	-			-	-	-						DX: NPD; VIRO 0/10 BACTE 0/8

\*Sampled and reported by A. D. Munson.

Appendix E. Summary report of Eagle Fish Health Laboratory results for Grace Hatchery, January 1 – December 31, 1997.

Brood year	Stock	Species	Accession	IHN	IPN	EIBS	BKD	FUR	ERM	CWD	PKD	WHD	CSH	ICH	GBD	Diagnoses
1997	Hayspur	Rainbow trout	97-034	-	-			-	-	+						DX: MAS, CWD; VIRO 0/10, <i>F. psychrophilum</i> 1/8, <i>A. hydrophila</i> 3/8
1997	Hayspur	Rainbow trout	97-189	-	-			-	-	+						DX: CWD; VIRO 0/10, <i>F. psychrophilum</i> 8/8
1997	Hayspur	Rainbow trout	97-245					-	-	-						DX: <i>Pseudomonas</i> , <i>Flavobacteriosis</i> ; <i>P. fluorescens</i> 1/10, <i>Flavobacter spp.</i> 1/10

Appendix F. Summary report of Eagle Fish Health Laboratory results for Hagerman Hatchery, January 1 – December 31, 1997.

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Brood year	Stock	Species	Accession	IHN	IPN	EIBS	BKD	FUR	ERM	CWD	PKD	WHD	CSH	ICH	GBD	Diagnoses
1996	Hayspur	Rainbow trout	97-123A													IX: Gill aneurysms 14/20, 5 low, 7 moderate, 2 high (Sampled 4/16)
1996	Hayspur	Rainbow trout	97-123B													IX: Gill aneurysms 11/20, 2 low, 5 moderate, 4 high (Sampled 5/20)
1996	Trout Lodge	Kamloops trout	97-124A													IX: Gill aneurysms 5/20, 2 low, 3 moderate (4/16)
1996	Trout Lodge	Kamloops trout	97-124B													IX: Gill aneurysms 11/20, 1 low, 6 moderate, 4 high (5/20)
1996	Trout Lodge	Kamloops trout	97-169					-	-	-						IX: MAS, Columnaris; <i>A. hydrophila</i> 2/3, <i>F. columnaris</i> 2/3
1996	Trout Lodge	Kamloops trout	97-170					-	-	+						IX: CWD, <i>Pseudomonad Septicemia</i> ; <i>P. fluorescens</i> 3/3, <i>F. psychrophilum</i> 1/3
1996	Trout Lodge	Kamloops trout	97-171													IX: Gill aneurysms 11/19, 1 low, 7 moderate, 3 high (5/20)
1997	Hayspur	Kamloops trout	97-183A					-	-	+						DX: CWD, MAS; VIRO 0/10, <i>F. psychrophilum</i> 6/8, <i>A. hydrophila</i> 5/8
1997	Hayspur	Rainbow trout	97-183B					-	-	+						DX: CWD, MAS; VIRO 0/10, <i>F. psychrophilum</i> 6/8, <i>A. hydrophila</i> 5/8

Appendix F. Summary report of Eagle Fish Health Lab for Hagerman Hatchery, January 1 – December 31, 1997 (Continued).

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Brood year	Stock	Species	Accession	IHN	IPN	EIBS	BKD	FUR	ERM	CWD	PKD	WHD	CSH	ICH	GBD	Diagnoses
1997	Hayspur	Kamloops trout	97-184	-	-			-	-	+						DX: CWD, MAS; VIRO 0/5, <i>F. psychrophilum</i> 3/4 <i>A. hydrophila</i> 1/4
1997	Hayspur	Kamloops trout	97-194	+	-			-	-	+						DX: IHN, CWD; IHNV 1/2 (5-fish pools), IPNV 0/10, <i>F. psychrophilum</i> 4/4
1997	Hayspur	Kamloops trout	97-195					-	-	+						DX:CWD, MAS; VIRO 0/10, <i>F. psychrophilum</i> 2/4, <i>A. hydrophila</i> 1/4
1997	Trout Lodge	Kamloops trout	97-196	-	-			-	-	+						DX: CWD, MAS; VIRO 0/10, <i>F. psychrophilum</i> 4/4, <i>A. hydrophila</i> 1/4
1997	Hayspur	Kamloops trout	97-197	+	-			-	-	+						DX: IHN, CWD, MAS; IHNV 2/2 (pools), IPNV 0/10 <i>F. psychrophilum</i> 4/4, <i>A. hydrophila</i> 1/4
1997	Hayspur	Rainbow trout	97-198	+	-			-	-	-						DX: IHN; IHNV 1/1(5-fish BACTE-NSG
1997	Mixed	Kamloops trout	97-457	+	-			-	-	-						DX: IHN, MAS; IHNV ½ (4-fish pools), IPNV 0/8, <i>A. hydrophila</i> 3/8, <i>Citrobacter freundii</i> 1/8, <i>Pseudomonas spp.</i> 1/8

Appendix G. Summary report of Eagle Fish Health Laboratory results for Hayspur Hatchery, January 1-December 31, 1997.

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Brood year	Stock	Species	Accession	IHN	IPN	EIBS	BKD	FUR	ERM	CWD	PKD	WHD	CSH	ICH	GBD	Diagnoses
Brood	Colorado River	Rainbow trout	97-002	-	-		+									IX: RS; VIRO 0/50, DFAT 0/10, MFAT 0/50, ELISA 2/10 (both low)
Brood	Hayspur	Kamloops trout	97-003	-	-		+									IX: RS; VIRO 0/10, DFAT 0/10, MFAT 0/10, ELISA 1/10 (low)
Brood	Colorado River	Rainbow trout	97-010	-	-		+									IX: RS; VIRO 0/45, DFAT 0/20, MFAT 1/45, ELISA 1/20 (mod.)
Brood	Hayspur	Kamloops trout	97-012	-	-		+									IX: RS; VIRO 0/31, DFAT 0/25, MFAT 0/11, ELISA 2/25 (both low)
Brood	Colorado River	Rainbow trout	97-017	-	-		+									IX: RS; VIRO 0/30, DFAT 0/10, MFAT 0/30, ELISA 2/10 (both low)
Brood	Hayspur	Kamloops trout	97-026	-	-		+	-	-	-						IX: RS; VIRO 0/16, DFAT 0/35, MFAT 0/16, ELISA 3/25 (all low), OVARIAN BACTE-NSG
Brood	Colorado River	Rainbow trout	97-028	-	-		+									IX: RS; VIRO 0/25, MFAT 1/25 (tntc)
Brood	Hayspur	Kamloops trout	97-035	-	-		+									IX: RS; VIRO 0/36, DFAT 0/8, MFAT 2/36, ELISA 2/6 (both high)
1995	Hayspur	Kamloops trout	97-087	-	-	-	+	-	-	-						IX: RS; VIRO 0/60 DFAT 0/60, WHD 0/60 ELISA 1/60 (low), EIBS 0/5, BACTE-NSG Nucleospora 0/5
1995	Hayspur	Kamloops trout	97-088	-	-	-	+	-	-	-						IX: RS, Bacteremia VIRO 0/60, DFAT 0/60, ELISA 5/60 all low, Nucleospora 0/5, EIBS 0/5, WHD 0/60, Pseudomonas spp. 1/12

Appendix G. Summary report of Eagle Fish Health Lab results for Hayspur Hatchery, January 1 – December 31, 1997 (Continued).

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Brood year	Stock	Species	Accession	IHN	IPN	EIBS	BKD	FUR	ERM	CWD	PKD	WHD	CSH	ICH	GBD	Diagnoses
1996	Colorado River	Rainbow	97-106	-	-	-	-	-	-	-		-				IX: <i>Pseudomonas</i> ; VIRO 0/60, DFAT 0/60, ELISA 0/60, WHD 0/60, EIBS 0/5, <i>Pseudomonas</i> spp. 1/12
1996	Hayspur	Rainbow trout	97-137					-	-	-						IX: <i>Pseudomonas</i> ; <i>P. paucimobilis</i> 1/56
1995	Hayspur	Rainbow	97-210	-	-			-	-	+						DX: EGD/BGD, CWD ; <i>P. fluorescens</i> (gills) 2/2 <i>F. psychrophilum</i> 1/2 (light carrier)
Brood	Hayspur	Rainbow	97-355	-	-		+	-	-	+						IX: RS, CWD carrier ; VIRO 0/20, DFAT 0/20, <i>F. psychrophilum</i> 1/20 ELISA 3/10 (low),
Brood	Hayspur	Rainbow trout	97-395	-	-		-									IX: NPD; VIRO 0/30, FAT 0/30, ELISA 0/30
Brood	Hayspur	Rainbow trout	97-424	-	-		-			-		-				IX: NPD; VIRO 0/50, FAT 0/50, ELISA 0/10 WHD 0/10, CWD 0/20
Brood	Hayspur	Kamloops trout	97-436	-	-		+									IX: RS; VIRO 0/40, FAT 0/40, ELISA 1/10 (o.d. = 0.107)
Brood	Hayspur	Rainbow trout	97-443	-	-		-									IX: NPD; VIRO 0/50 FAT 0/50, ELISA 0/10
Brood	Hayspur	Kamloops trout	97-455	-	-		-									IX: NPD; VIRO 0/36, FAT 0/36, ELISA 0/10
Brood	Hayspur	Rainbow trout	97-456	-	-		+									IX: RS; VIRO 0/30 FAT 0/30, ELISA 2/10 (0.175, 0.652-both culled)
Brood	Hayspur	Kamloops trout	97-476	-	-		-									IX: NPD; VIRO 0/12, FAT 0/12, ELISA 0/10
Brood	Hayspur	Rainbow trout	97-477	-	-		+									IX: RS; VIRO 0/20, FAT 0/20, ELISA 3/10 (0.107, 0.131, 0.161)

Appendix H. Summary report of Eagle Fish Health Laboratory results for Henrys Lake Hatchery, January 1 – December 31, 1997.

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Brood year	Stock	Species	Accession	IHN	IPN	EIBS	BKD	FUR	ERM	CWD	PKD	WHD	CSH	ICH	GBD	Diagnoses
Brood	Henrys Lake	Cutthroat trout	97-049				+									IX RS; FAT 1/70 TNTC (5-fish pools)
Brood	Henrys Lake	Cutthroat trout	97-066	-	-		-									IX: NPD; VIRO 0/105 FAT 0/90
Brood	Henrys Lake	Cutthroat trout	97-080	-	-		+	-	-	-		-				IX: RS, <i>Pseudomonas</i> ; VIRO 0/60, FAT 0/60, ELISA 7/12 pools, all low, <i>P. aerofaciens</i> 2/12
Brood	Henrys Lake	Cutthroat trout	97-107	-	-		+									IX: RS; VIRO 0/105, FAT 1/30 TNTC
Brood	Henrys Lake	Cutthroat trout	97-126				-									IX: NPD; FAT 0/273
Brood	Henrys Lake	Cutthroat trout	97-127	-	-		-									IX: NPD; VIRO 0/140 FAT 0/23
Brood	Henrys Lake	Cutthroat trout	97-139				-									IX: NPD; FAT 0/245
Brood	Henrys Lake	Cutthroat trout	97-154				-									IX: NPD; FAT 0/161
Brood	Henrys Lake	Brook trout	97-392	-	-		-									IX: NPD; VIRO 0/25 FAT 0/70

Appendix H. Summary report of Eagle Fish Health Laboratory results for Henrys Lake Hatchery, January 1 – December 31, 1997.

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Brood year	Stock	Species	Accession	IHN	IPN	EIBS	BKD	FUR	ERM	CWD	PKD	WHD	CSH	ICH	GBD	Diagnoses
Brood	Henrys Lake	Brook trout	97-404	-	-		-									IX: NPD; VIRO 0/50, FAT 0/60
Brood	Henrys Lake	Brook trout	97-411	-	-		-									IX: NPD; VIRO 0/50, FAT 0/60
Brood	Henrys Lake	Brook trout	97-420	-	-		-									IX: NPD; VIRO 0/50, FAT 0/55
Brood	Henrys Lake	Brook trout	97-431	-	-		+	-	-	+		+				IX: RS, WHD, CWD; VIRO 0/60, FAT 0/60, <i>M. cerebralis</i> 1/12 (histo confirmed), <i>F. psychrophilum</i> 2/12 <i>F. odoratum</i> 1/12
Brood	Henrys Lake	Brook trout	97-432	-	-		-									IX: NPD; VIRO 0/15, FAT 0/53
Brood	Henrys Lake	Brook trout	97-433				-									IX:NPD; FAT 0/35

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Appendix I. Summary report of Eagle Fish Health Laboratory results for Mackay Hatchery, January 1 – December 31, 1997.

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Brood year	Stock	Species	Accession	IHN	IPN	EIBS	BKD	FUR	ERM	CWD	PKD	WHD	CSH	ICH	GBD	Diagnoses
1996	Saratoga	Brown trout trout	97-163	-	-		-	-	-	-		-				IX:MAS; VIRO 0/20, FAT 0/20, WHD 0/20 <i>A. hydrophila</i> 1/4
1996	Paint Bank	Brown trout	97-164	-	-		-	-	-	-		-				IX:NPD; VIRO 0/20 ELISA 0/20, WHD 0/20 BACTE-NSG
1996	Deadwood Reservoir	Kokanee salmon	97-165	-	-		-	-	-	-		-				IX:NPD; VIRO 0/20 FAT 0/20, WHD 0/20 BACTE-NSG
1996	Colorado	Kokanee salmon	97-166	-	-		-	-	-	-		-				IX: NPD; VIRO 0/20 FAT 0/20, WHD 0/20 BACTE-NSG
1996	West slope (Fish Lake)	Cutthroat trout	97-167	-	-		-	-	-	-		-				IX: NPD; VIRO 0/20 FAT 0/20, WHD 0/20 BACTE-NSG
Brood	Payette Lake	Kokanee Salmon	97-314	-	-		+					-				IX: RS; VIRO 0/75, ELISA 11/15 (pools, all low), WHD 0/75
Brood	Payette Lake	Kokanee Salmon	97-335	-	-		+					-				IX: RS; VIRO 0/75, ELISA 14/14 (pools, all low), FAT 0/75, CSH 0/75, <i>Nucleospora</i> 0/12

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Appendix J. Summary report of Eagle Fish Health Laboratory results for McCall Hatchery Resident Program, January 1 – December 31, 1997.

Brood year	Stock	Species	Accession	IHN	IPN	EIBS	BKD	FUR	ERM	CWD	PKD	WHD	CSH	ICH	GBD	Diagnoses
Brood	Westslope (Fish Lake)	Cutthroat trout	97-155	-	-		+					-	-			IX: RS; VIRO 0/71, ELISA 14 (13 low, 1 high), DFAT 0/20, CSH 0/20 WHD 0/20
1996	Westslope (Fish Lake)	Cutthroat trout	97-177	-	-		-	-	-	-						IX: NPD, VIRO 0/60, FAT 0/60, BACTE-NSG

Appendix K. Summary report of Eagle Fish Health Laboratory results for Nampa Hatchery, January 1 – December 31, 1997.

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Brood year	Stock	Species	Accession	IHN	IPN	EIBS	BKD	FUR	ERM	CWD	PKD	WHD	CSH	ICH	GBD	Diagnoses
1996	Hayspur	Kamloops trout	97-005	-	-			-	-	-						DX: Bacteremia; VIRO 0/3, <i>Flavobacter spp.</i> 3/3
1996	Trout Lodge	Kamloops trout	97-015					-	-	+						DX: CWD; <i>F. psychrophilum</i> 8/8
1996	Trout Lodge	Kamloops trout	97-018	-	-			-	-	-						DX: NPD; VIRO 0/10 BACTE-NSG/8
1996	Trout Lodge	Kamloops trout	97-019	-	-			-	-	+						DX: CWD; VIRO 0/10 <i>F. psychrophilum</i> 8/8
1996	Saratoga	Brown trout	97-046	-	-			-	-							DX: MAS; VIRO 0/10, <i>A. sobria</i> 4/8, <i>Nucleospora</i> 0/4
1996	Saratoga	Brown trout	97-110					-	-	-		-	-			IX: Bacteremia; <i>Flavobacter odoratum</i> 1/8
1997	Hayspur	Rainbow trout	97-121	-	-			-	-	+						DX: CWD, MAS; VIRO 0/5, <i>F. psychrophilum</i> 3/4 <i>A. hydrophila</i> 1/4
1997	Hayspur	Rainbow trout	97-157					-	-	-						DX: MAS; <i>A. hydrophila</i> 2/12
1996	Saratoga	Brown trout	97-178	-	-	-		-	-	+						DX: MAS, CWD; VIRO 0/10, EIBS 0/3 <i>A. hydrophila</i> 4/8 <i>F. psychrophilum</i> 3/8 <i>Nucleospora</i> 0/8,
1996	Trout Lodge	Kamloops trout	97-206					-	-	+						DX: MAS, CWD; <i>A. hydrophila</i> 2/6 <i>F. psychrophilum</i> 2/6
1997	Hayspur	Rainbow trout	97-344	-	-		-	-	-	-		-				IX: NPD; VIRO 0/60, ELISA 0/60, WHD 0/60, BACTE-NSG
1997	Trout Lodge	Kamloops trout	97-434	-	-			-	-	-						DX: Bacteremia; VIRO 0/5, <i>Citrobacter freundii</i> 1/8

**Submitted by:**

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